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## Uncovering Knowledge Conflicts Surrounding Mulloway in NSW

Bridget Mullany

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# Uncovering Knowledge Conflicts Surrounding Mulloway in NSW

## Abstract

Demands on fish stocks are generated by the millions of people who rely upon ocean and river systems for employment, food security and recreation. As such, sustainable fisheries management is an urgent global objective. This thesis addresses a challenge to the sustainable management of fisheries that lies in resolving conflicts over access to and use of fisheries resources. This thesis contributes a political ecology perspective to those advocating for the importance of human dimensions to fisheries management. The thesis reports on a mixed-method qualitative research design employed to gather empirical materials surrounding the conflict over Mulloway in the New South Wales coast and estuary waters of the Hawkesbury River, adjacent to metropolitan Sydney. Fifteen participants consented to participate in the project, five each from three social groups often involved in such conflicts: fisheries management and scientists; recreational fishers and commercial fishers. Employing a political ecology framework the thesis extends its aim to provide insights to two questions about the conflict over Mulloway: 'Is there a problem?' and 'Who is to blame?' In addressing these questions through a political ecology lens the thesis attends to how conflict is embedded in the different economic relationships of recreational and commercial fisheries, a hierarchy of environmental knowledge and uneven social relationships. The thesis underscores the importance of human dimensions to fisheries management to help resolve environmental management conflicts and points towards future research agendas.

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# UNCOVERING KNOWLEDGE CONFLICTS SURROUNDING MULLOWAY IN N.S.W



Bridget Mullany

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*“It was the most exciting and awe-inspiring thing I’d ever seen – that big jewie with its colours still lit up shuddered there in the belly of the old clinker-built half-cabin boat. There was no wind that morning and the distinctive musky smell of the mulloway filled the air as I stared at this beautiful creature”*

-Robert Anderson 2002.

## ABSTRACT

Demands on fish stocks are generated by the millions of people who rely upon ocean and river systems for employment, food security and recreation. As such, sustainable fisheries management is an urgent global objective. This thesis addresses a challenge to the sustainable management of fisheries that lies in resolving conflicts over access to and use of fisheries resources. This thesis contributes a political ecology perspective to those advocating for the importance of human dimensions to fisheries management. The thesis reports on a mixed-method qualitative research design employed to gather empirical materials surrounding the conflict over Mulloway in the New South Wales coast and estuary waters of the Hawkesbury River, adjacent to metropolitan Sydney. Fifteen participants consented to participate in the project, five each from three social groups often involved in such conflicts: fisheries management and scientists; recreational fishers and commercial fishers. Employing a political ecology framework the thesis extends its aim to provide insights to two questions about the conflict over Mulloway: ‘Is there a problem?’ and ‘Who is to blame?’ In addressing these questions through a political ecology lens the thesis attends to how conflict is embedded in the different economic relationships of recreational and commercial fisheries, a hierarchy of environmental knowledge and uneven social relationships. The thesis underscores the importance of human dimensions to fisheries management to help resolve environmental management conflicts and points towards future research agendas.

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# CHAPTER 1: INTRODUCTION



## 1.1 RESEARCH SIGNIFICANCE AND BACKGROUND

The world's fisheries are no longer considered as an endless abundance. Government fisheries departments are at the forefront of a sustainability goal; to increase fish abundances and reduce fishing pressure (Hilborn 2010). Demands on fish stocks are generated by the millions of people who rely upon ocean and river systems for employment and food security (Hilborn et al. 2003), with 10-12 percent of the world's population employed in capture fisheries (UN FAO 2014). Over the last 50 years, the world's rapidly growing population has seen substantial increases in fishing effort (World Wildlife Fund, 2018). Consequently, over 85% of the world's fish stocks are understood to be overfished or currently fished at full capacity (UN FAO 2012). Furthermore, demands on fish are generated by leisure activities in the form of recreational fishing (Thomas et al. 2003). Overfishing is understood to modify the recruitment capacity of species - that is, the ability of a fish stock to produce surviving offspring (Britten et al. 2016). In addition there are numerous other pressures that are understood to be threats to fisheries. Climate change, pollution and habitat degradation are all considered as key threats to fisheries (Mance 2012; Brander 2010; Derraik 2002). As such, sustainable fisheries management is an urgent global objective and central to Sustainable Development Goal 14, Life Below Water (UNDP).

A key challenge to the sustainable management of fisheries lays in addressing and resolving conflicts over appropriate levels of access to and use of fisheries resources. Long have struggles over resources been present between artisanal and commercial fishers (Olomola 1998; Beitzl 2012; Islam et al. 2016). Now with the growing prominence of recreational fishers, specifically within Australia, resource conflict centered on fish now involves another stakeholder (McPhee et al. 2002).

As of 2005, Mulloway (*Argyrosomus japonicus*) has been identified by the Department of Primary Industry (DPI) as an overfished species (DPI, 2016). Mulloway lives in the coastal and estuarine waters that surround Australia and parts of Asia (Silberschneider et al. 2009). Fishers consider Mulloway as an iconic species, as they can grow to sizes larger than 2m (Kailola et al., 1993). As such, they are highly targeted by both recreational and commercial fishers (DPI, 2016). Within New South Wales (NSW), recreational and commercial fishers catch comparable numbers of Mulloway annually (DPI, 2016). Scientific assessment of the species populations indicated the numbers of

mature adults, capable of reproduction, are now below the level needed to sustain the population, with predictions of continual species decline (DPI, 2016). Commercial prawn trawlers interact with Mulloway indirectly through by-catch. In contrast, estuary mesh netters target Mulloway and directly interact with the species. Recreational fishers target the species directly.

Mulloway isn't alone when it comes to fisheries collapse. This trend of decline/bust has parallels in many other fisheries, where juvenile fish are taken out of the system before they are able to reproduce (Young et. al 2014) An example of the pressure commercial fishing can cause is illustrated in Californian Sardine fishery collapse (Radovich, 1982). Similarly, Blue Groper populations between 1952 and 1967 saw a population declined of 90%, this reduction almost completely due to the fishing pressure exerted by recreational spear fishers (Young et al. 2014). Recreational fishing has been estimated to contribute to 12% of global fish harvests (Forbes et al. 2015). The pressure both recreational and commercial fishing can have on fish populations, therefore are contributing factors in some fisheries collapse.

In 2013, the DPI implemented a recovery program that established new fishing restrictions for both groups from November 1<sup>st</sup> 2013. This included;

- Reducing the recreational bag limit from 5 to 2.
- Increasing the minimum legal length from 45cm to 70cm.
- By-catch limit of 10 for Commercial Estuary General fishers using mesh nets.
- A 500kg limit imposed upon commercial ocean haul.

Additionally, the DPI's assessment identified that "fishing related" mortalities were occurring not only to mature adults (responsible for stock replenishment) but also to the juvenile fish within population (DPI, 2017). By-catch within the estuarine prawn-trawl fishery was attributed to the decline in juvenile fish numbers (Silberschneider et. al 2008). Prawn trawls (commercial fishers) were usually attributed as responsible for these high mortalities, particularly within the Hawkesbury River (Broadhurst et. al 1994).

The science surrounding Mulloway's lifecycles, growth, distribution and fishing pressure is well researched (DPI. 2016; Macbeth et al 2004; Alós et al. 2017; Broadhurst et. al 1994; Kailola et al. 1993; Silberschneider et. al 2008). Missing from the literature is knowledge about the people who catch and research Mulloway.

As argued by Bavinck (2001), fisheries regulation should not just be the responsibility of the state. Bavinck's work highlights that there are distinct regulatory practices and knowledges that occur among both the artisanal/recreational fishers and trawler fishers (commercial) outside of the state apparatus. Hence, fishers' practices and knowledges should be legitimised and included in the management of fisheries. One key aspect of managing the environmental impact of fishers is to build knowledges and understanding of fishers' key motivations, behaviours and attitudes (Magee et al. 2018). Understanding the differences in knowledges possessed by fishers has huge potential to assist fisheries managers. Through developing and assisting targeted communication strategies, fisheries managers can further understand how and why fishers may respond and accept changes in regulations or not (Magee et al. 2018). This way of thinking has not yet been employed within the case of Mulloway.

With the new tighter restrictions on Mulloway catch and effort conflict has arisen between commercial and recreational fisher. Scientific reports of Mulloway decline begs the questions of 'blame'. This conflict, over who is to 'blame' is visible upon fishing forums, and within the media within fishing magazines and alike. Scientific narratives are often employed by both sides to legitimise these claims. Mulloway may therefore provide an insight into questions of resource conflict, whereby conflicts are defined as "*situations that occur when two or more parties with strongly held opinions clash over objectives, and when one party is perceived to assert its interests at the expense of another*" (Redpath et al. 2013). Conflicts are often exacerbated because members of a group possess similar experiences, cultural background and social networks (Shepardson et al. 2007). Hence, members of a group will perceive and interpret events in a similar way with the implication that they in turn think differently to other groups. This trend can often exacerbate conflicts between groups, acting to widen the differences between groups.

Resource conflict is a concern for fisheries managers around the world. In 2017 the NSW Marine Estate identified marine resource conflict as a state priority. This report drew attention to how conflict arises from the interface between non-compatible uses of the marine estate.

Importantly, during this project Mulloway regulatory changes occurred in NSW. These came into effect on the 1st September 2018, after data collection had been completed. As posted upon DPI's website "the removal of the possession limit of 10 Mulloway between 45 and 70 cm that currently applies to Estuary General meshing net fishers. This will mean that a 70 cm Mulloway minimum size limit will apply to all fishers." This also saw "A reduction in the recreational bag limit from two to one."

Mulloway therefore provides an opportunity to examine questions of conflict in natural resource management. Current attempts to resolve this conflict have privileged scientific knowledge before that of social science-based approaches, with limited consideration given to the human knowledge systems, values, beliefs, economies and practices which underpin this conflict. Though it is understood that science cannot alone deliver the answers to the questions that plague this debate, but rather can only assess the trade-offs between fishing yield and subsequent environmental impact (Hilborn 2010). Thus, insights drawn from human dimensions research will not only help to inform Mulloway management but the broader, and ever-present issue of resource conflict within and outside of fisheries.

## **1.2 RESEARCH AIM AND QUESTIONS**

The project aim is to offer insights to the conflict over Mulloway decline, specifically through the use of a political ecology theoretical lens. Political ecology offers an understanding of resource management conflict at the nexus of economic relations, environmental knowledge and uneven social power. Two research questions are asked to better understand the Mulloway conflict: 'Is there a problem? And, 'Who is to blame?'

### **1.3 THESIS STRUCTURE**

To address the research aims and questions this thesis is split into the following chapters. Chapter 2 situates these research aims and questions within a wider literature. Chapter 3 outlines a method that aligns with the conceptual thinking of political ecology. Chapter 4 provides an interpretation of the empirical data through the conceptual lens to addresses the first research question “Is there a problem?” Chapter 5 turns to the second research question: “Who is to blame?” Chapter 6 concludes via first returning to the thesis aim and research questions, then outlining a future research agenda.

## CHAPTER 2: LITERATURE REVIEW



(DPI, 2016)

## 2.0 INTRODUCTION

This chapter aim is to review the different approaches used to help explain environmental management conflicts. The chapter is structured into four parts. The first section provides an overview of why people are often positioned as problem in fisheries management. The second outlines the implications arising from the change in the dominant environmental management approach in Australian fisheries from single species to ecosystems that pays limited attention to people. The third discusses literature that points to the importance of incorporating the human dimensions in fisheries management. The final section introduces the concepts of political ecology and advocates for this framework as entry point to better understand environmental management conflict. A version of political ecology advocated by Escobar (2006) is discussed that advocates for understanding how environmental conflict occurs at the intersection between economic relationships, environmental knowledge, and uneven social relationships, which may include gender, class, age and ethnicity.

## 2.1 ENVIRONMENTAL MANAGEMENT CONFLICTS

Environmental management conflicts are a global research priority across the social and natural sciences. Environmental management conflicts over access to energy, food and water resources are widespread across the globe, particularly in the last three decades (Lewicki, et al. 2003, Yaffee and Wondolleck 2000, Blackburn and Bruce 1995). Fishery management is no exception (Lewin et al 2006; Jones 1992; Britten et. al 2015, Silberschneider et al. 2008).

In the western world, science holds a privileged position in identifying environments at risk and offering management solutions (Ozawa 1996). Scientific knowledge is often privileged because it is understood as objective. In this way data collection made through scientific enquiry can be used to offer seemingly rational ideas to help resolve conflicts over access to a specific resource. Conventionally, in environmental management people are positioned as the problem rather than part of the solution (Head et al. 2005). Hence, attention tends to focus upon understanding the ecology that is threatened by people. The science of Orange Roughy (*Hoplostethus atlanticus*) is



illustrative of this thinking. Science identified that the population numbers of the deep-water, economically valuable Orange Roughy had depleted dramatically in the 1990s. Scientific scholarship attributed the species decline to overfishing mortality from commercial fishers (AMFA 2002). Commercial fishers were positioned as the threat. In this case, the science of the declining Orange Roughy fishery was integral to introducing legislation that closed the fishery. As such, science is an instrument of accountability in environmental conflicts. Science is crucial in the formation of environmental knowledge and predicting outcomes, if particular patterns of human behaviour remain unchanged.

That said; how scientific knowledge is employed by specific people within environment conflicts is separate from the science itself (Ozawa 1996). There is a politics to science. In this way, science can be used to advocate for opposing sides that are involved in environmental conflicts (Collingridge and Reeve 1986). For example, the tobacco industry discredited scientific data linking smoking to cancer. Through questioning the validity of the science tobacco companies 'used' science to push their motive. Likewise, science is used in some environmental conflicts to advocate for certain interests (Dickson 1988; Fulton 1999; Forsyth 2004). Maser et al. (2011) contends that science is not designed for this purpose and science can only do its job when scientific data is accepted for what it is; an insight into environmental relationships; science is facts and ideas not moral opinions.

It increasingly understood that science alone might not provide solutions to environmental conflict (Head et al. 2005). Vitousek (1997) states 'most aspects of the structure and functioning of Earth's ecosystems cannot be understood without accounting for the strong, often dominant influence of humanity.' Mascia et al. (2003) asks the ever-present question; how we continuously get the science right, but our attempts at conservation to sustain target species or ecosystems often fail. Mascia et al. (2003) acknowledge that conservation efforts and environmental policy are inherently social phenomena. As such, our failures surrounding conservation can be understood as social faults rather than solely environmental. Subsequently environmental conflicts can be understood to not be driven by analytical failings of science and technology but

rather by differences in values (Barcley et al. 2017; Sewll 2005). People are an integral part of the solution and acknowledging human dimensions within natural resource management issues is essential (Barcley et al. 2017; Charnley et. al 2017). In order to resolve and fully understand environmental conflicts there is a need to re-think the way, as a society, we live, interact with one another, use and understand the non-human world (Maser and Pollio 2011).

Better understanding the social and cultural processes is crucial to environmental management, and should occur alongside the biophysical sciences (Maser et al. 2011; Barcley et al. 2017). As examined by Daniels and Walker (2001), innovative measures in natural resource management and conflict are occurring through deliberative policy strategies. This approach advocates for policy as a collaborative strategy through the involvement of citizens and management agencies. J. Holmes foreword, present in Maser & Polio's Book "Resolving environmental conflicts" argues people are usually reluctant to change personal lifestyles and values, until they are encouraged to reflect upon their decisions. People are often "consciously blind" to the motives that exist in their decision-making and how these effect or inflame environmental issues. Thus, Holmes suggests that mediation is an integral process in resolving any environmental conflict. Mediation, historically speaking, is a relatively new approach to dealing with environmental conflicts. Mediation allows those involved in an environmental conflict to explore options that may act to reconcile the conflict. This is one methodological approach where people through sharing diverging and reflecting upon different meanings and experiences of fishing become an integral part of fishing a solution.

## **2.2 MANAGING AUSTRALIAN FISHERIES**

Historically, Australian fisheries management was informed by ecological approaches that prioritized single species and commercial fisheries. Priority was given to conservation biology research, specifically monitoring, and the application of predesigned measures and models aimed to maximise the catch of a single target species of family and transnational fishes. Key measures and models included; catch per unit effort (CPUE) and maximum sustainable yield (MSY) (Jentoft and McCay

1995; Pikitch et al. 2004). CPUE is a modelling tool used as an indirect measure of target species abundance, in relation to the amount of ‘effort’ exerted to catch target species. MSY refers to the largest theoretical catch quantity that can be extracted from a species stock indefinitely. Both of these tools are applied to inform the management of single species. As such, much fisheries management literature focuses on the ecology and life histories of individual fish species (Pecuchet et al. 2017; Kamler 2012; Caddy et al. 1995; Adams 1980).

Ecosystem-based fisheries management (EBFM) approaches started to be incorporated into Australian fisheries management in the 2000s (Olsson et al. 2008), including that of New South Wales. This approach is especially important within Australia, where the fisheries are characterised by huge diversity in both fishing practices and target species (McPhee 2008). Ecosystem-based fishery management challenged conventional thinking that focussed upon single species. This scientific approach acknowledges the role habitat health and food chains play within an ecosystem to be crucial in sustaining the health of singular and multiple species in management (Pikitch et al. 2004). This switch in management objectives coincided with bodies of literature highlighting the main threats to fisheries was primarily habitat degradation (Cowx et al. 2010; Welcomme et al. 2010) a far greater threat to aquatic ecosystems than over fishing (Mance 2012; Brander 2010; Derraik 2002). Though still, management of fishing pressure remains the priority of fisheries management.

## **2.3 HUMAN DIMENSIONS RESEARCH IN FISHERIES MANAGEMENT**

Researchers are paying greater attention to people in marine environmental management debate (Voyer et al. 2012.) Stepping outside of the nature/culture binary that positioned humans as a threat to be managed, social scientists are advocating for how humans must be conceived as an integral part of the solution. Knowledge of how people are positioned in relations to fish through technologies, ideas and economies is argued to be integral to fisheries management (McPhee 2008).

In the past, little attention was paid to the knowledges of the people catching the fish (Arlinghaus and Mehner 2005). Copeland et al. (2017) argue that a key aspect of

managing environmental impact is to better understand the stakeholder's key motivations, behaviours and attitudes. Fisheries management has been continuously aided by the involvement of stakeholders, and the harboring of respectful working relationships have been prioritised (Jentoft and McCay 1995; Reed 2008). Compliance is enhanced when stakeholders are involved in the decision-making process. As argued by M. Bavinck (2001), there are distinct regulatory practices and knowledges that occur between both the recreational and commercial fishers outside of the regulatory organisations, such as catch and release. These knowledges and practices should be considered and included within holistic fisheries conflict management. Incorporating human dimensions research into fisheries management facilitates breaking down of pre-existing biases and opportunities to understand how fishers are embedded in social norms, economic relations and knowledge of the environment. When it comes to environmental conflicts ecological knowledge is essential, as to are the knowledges of the stakeholders involved.

Yet, the integration of fisher's knowledge alongside that of the conservation biologist/fisher manager seldom occurs within fisheries management (Copeland et al. 2017). Campbell et. al (2008) attribute the lack of involvement of commercial fishers in policy making to how some scientific researchers may often assume that commercial fisheries relationship with fish is solely profit maximisation.

## **2.4 INTRODUCING POLITICAL ECOLOGY**

Several theoretical approaches are being advanced to help incorporate people into environment management. First, the advocacy conflict framework understands conflict to be shaped by networks of shared values and beliefs. Hence, individuals from groups form “advocacy coalitions” based on these shared beliefs to push their own political agenda, within or outside of environmental conflicts (Matti et al.; 2011). As such the advocacy conflict framework is frequently used to describe the behaviours of stakeholder in political conflict (Weible 2006). Second, the DPSIR (Drivers–Pressures–State–Impacts–Responses) framework offers an insight into the relationship between society and the environment through describing the driving forces behind environmental impact, the forces that enable impacts and the eventual political response to such impacts (Kristensen 2004). Driving forces include transport and population.

These in turn place pressure through resource consumption and increase emissions leading to adverse environmental impacts.

Both these frameworks have much gravity, though with that said each lack aspects integral in understanding environmental conflict issues. A DPSIR focus on driving forces, and as such does not provide an in depth look into the social, environmental and political mechanisms that presented them in the first place. Similarly, the advocacy coalition framework falls short of including all social, environmental and political aspects of conflict into its framework. With that said, this project employs a third approach, that of political ecology.

Political ecology is hard to define (Robbins 2011). Early geographers explain political ecology as the combination of environmental concerns and political economy (Blaikie et al. 1987). Others stress the “need to link the distribution of power with productive activity and ecological analysis with the broader vision of bio-environmental relationships” (Greenberg et al. 1994 pp 1). While others define the field as: “The study of interdependence among political units and of interrelationships between political units and their environments” (Hempel 1996 p 150). Though different strands do exist, all share understanding of environmental change rooted in economic and political processes that help move attention from the local to the social context (Robbins 2011).

Political ecology appealed to social scientists at a time when nature and social relationships were being moulded and transformed through the global transition into a capitalist world (McCarthy 2017). The field had an early prominence in developing country settings, with a focus on agrarian communities and how they dealt with the social and ecological stresses of an impending capitalist economy (Neumann 2009). Political ecology has grown, from its early uses within a developing country context, to address environmental issues globally.

Political ecology moves away from the historical notion that ecological change and management are solely biophysical, though biophysical change was a focus of early political ecology strains (Walker 2005). Political ecology conceives how people engage with the non-human world as always being embedded in a nexus of nature, society relationships. A political ecology approach offers an entry point to thinking of how

environmental change and conflicts, along with management are always embedded in nature–society relationships. This theoretical lens brings to fore uneven power relations to better understand environmental change, conflict and management. It also focuses attention on how power is exercised as an economic, political, social and cultural force. Thus attention turns understanding the social power relationships involved, specifically how they are created and how they evolve (Kitchin and Thrift 2009).

Robbins (2011) describes an example in Tanzania and Kenya, where the use of political ecology assisted in understanding the complexity of environmental issues. These two bordering countries possess insignificant differences in rainfall, human populations and livestock numbers. Despite this, far greater declines in wildlife and habitat were occurring in Kenya at the time of the study. For Robbins (2011) the explanation lay in international economic relations and the increase of private holdings investing in export cereal grains in Kenya. This resulted in extensive cropping and associated habitat decline. These cereals are then exported and consumed globally. Kenya's increased trade links with global markets was argued to be driving local habitat loss. As such, this environmental crisis may be understood as an expression of Kenya's position within international trade agreements rather than just a local environmental one.

Political ecology offers a useful conceptual lens for fisheries management. For example, James Greenberg (2006) employed a political ecology framework when investigating shrimp fishery in the upper Gulf of California. Between 1989 and 1990, shrimp catch within the upper Gulf of California plummeted by up to 60% of prior catch rates. The following 3 years also saw similarly low rates of shrimp catch. In-turn commercial shrimp fishers were forced deeply into debt, many defaulting on loans consequently leading to the seizing or selling of many fishing boats. At the time, there was large out-cry from conservationists blaming fishermen for the huge decline in the shrimp population. Fishers were alleged to be continuing to fish even though they were previously aware of declining stocks, thus resulting in the crash of stocks and financial loss to the commercial fishers.

By examining this conflict through a political ecology lens, Greenberg (2006) troubled this explanation of the fisheries decline that levelled blame at commercial fishers. Instead, Greenberg (2006) argued that the issues that occurred in the Upper Gulf are rooted in bigger processes that stem from the way the upper Gulf's fisheries are

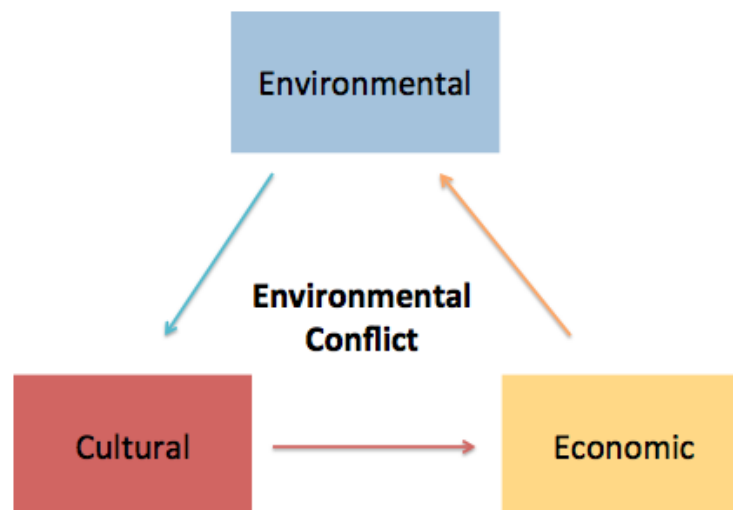
incorporated into the wider political and economic orders that represent an inherent problem of capitalism. Greenberg critiqued the formulation of policy within increasingly centralised regulatory bodies, including the Department of Fisheries. For Greenberg, the movement of control and regulation away from the Upper Gulf's shrimp fishery helped account for the fishery collapse. Over centralisation, a direct product of globalisation, resulted in government departments being oblivious to locally situated struggles and in turn slow to react to them. The shrimp fishery crash within the Gulf is an occurrence that is not uncommon and holds some parallels to the conflict that surround Mulloway in NSW.

The work by Beitzl (2010) on the Ecuadorian mangrove fisheries also holds parallels to the conflict surrounding Mulloway in NSW. Struggles over resources are understood to have positioned artisanal fishers versus shrimp farmers, with artisanal fishers marginalised by shrimp fishers. It is this struggle that Beitzl understands to be a threat to the sustainability of the fisheries. As such, Beitzl advocates for a political ecology approach to fisheries management.

#### 2.4.1 THEORETICAL FRAMEWORK

One strand of political ecology, advocated by Escobar (2006), argues that environmental conflicts can be understood through equity of access in three interconnected categories; 1) Economic, 2) Cultural and 3) Environmental (Figure 1). Escobar argues that each of the categories/rubrics hold equal importance when it comes to dealing with issues of environmental conflict (A. Escobar 2006). The economic dimension enables scholars to think about how the non-human world is engaged in different systems of exchange. For example, within a western society there are capitalist imperatives that underpin what often becomes taken for granted as 'resources'. Equally, for fish to become a resource they are embedded in uneven modes and relations of production. Hence, there becomes an economic imperative to better understand environmental change, conflict and management (R. Neumann 2009). In this project, Mulloway may be understood to become an economic 'resource' through how market forces operate as a process of commodification. In a market system, not all fish have equal dollar value. Some become more valuable in dollar terms because of their edibility, taste, size, scarcity or difficulty to catch. In fisheries, modes of relations

and production include the economic conditions under which fish are caught, processed and sold. For Mulloway it is important to think about how recreational and professional fishers are always embedded in sets of uneven economic relationships that may enable some greater capacity to catch, process or sell this species of fish.



**FIGURE 1: ENVIRONMENTAL, CULTURAL AND ECONOMIC RELATIONSHIPS IN ENVIRONMENTAL CONFLICTS**

The environment or ecology is the second dimension of the political ecology framework. The environmental or ecological is understood in terms of the knowledge of the non-human world. A political ecology framework acknowledges that knowledge of the environment is always culturally constituted, and therefore diverse. This dimension of the framework begs the question: How is Mulloway known? What accounts for the different ways in which Mulloway comes to be known? How is knowledge about Mulloway produced and circulated? Who positions themselves as experts? Alongside knowing Mulloway through market forces, that constitute this fish as a 'resource to be harvested', the sets of ideas drawn upon by different actors are crucial to knowing Mulloway. How certain environmental knowledge is prioritised over others may operate towards and against access to Mulloway.



The cultural dimension refers to the importance of uneven social relationships. The cultural dimension encourages scholars to reflect on how environmental management, conflict and knowledge may be differentiated along the lines of gender, ethnicity, sexuality, age as well environmental and professional identities. Gender is outlined as one of the 13 guiding principles in *Securing Sustainable Small-Scale Fisheries* (Kleiber 2017), though it is still not completely agreed upon globally. The gendered attributes of fishing are starting to gain some attention in the literature (Kleiber et. al 2014, Kleiber et. al 2017; Foale et al. 2016). While, women do fish and hold in-depth knowledges of fish/fisheries this is often absent from fisheries management (E. Bennett, 2005; Barclay et al. 2017). In this project, paying attention to the cultural dimensions is important for at least two reasons. On the one hand, people may have differential access to Mulloway because of how nature-society relationships are gendered, sexed and racialised. Cultures of recreational and commercial fishers are embedded in fishing masculinities. It is predominantly men-who-fish. On the other hand, how people perform particular social identities may shape how they understand environmental change, management and conflict (Buechler et. al 2015).

## 2.5 CONCLUSION

Conflict over access to fish is evident globally. The aim of this chapter was to better understand different approaches to resolving environmental resource management conflict. The literature points to how conflict in part may arise from how fisheries management is underpinned by how the fish are known primarily as a ‘resource’ to be managed. Fishers are positioned as the problem rather than as part of the solution. This is evidenced by the dominant approaches in Australian fisheries management. That said, incorporating the human dimensions into fisheries management is increasingly being advocated for in the literature. One approach is that of political ecology that calls for understanding resource conflict in terms of how fish are embedded in capitalist relations, different environmental knowledge and uneven social power dynamics. The next chapter details the methods by which this research employed a political ecology theoretical lens to explore the environmental conflict surrounding Mulloway, in NSW Australia.

## CHAPTER 3: METHODOLOGY



*“Jim starts the engine and we head out onto the river, the early morning fog is starting to rise”*

### 3.1 INTRODUCTION

This chapter discusses the methods to better understand the conflict surrounding Mulloway in NSW. Current attempts to resolve this conflict have privileged scientific over social science-based approaches. Hence limited consideration has been given to the human knowledge systems, values, beliefs and practices that underpin this conflict. As such, this project aims to better understand the conflict through the lens of political ecology of three key stake holding groups; 1) recreational fishers, 2) commercial fishers and 3) fisheries managers and scientists. This project uses a qualitative approach to reveal insights to the economic relations, environmental knowledge and uneven social power dynamics. This chapter explains how rigor was achieved through the project design. Following Baxter and Eylse (1997), rigor in qualitative research is underpinned by the notion of trustworthiness rather than validity. This is because rather than making claims of truth, qualitative research acknowledges that all knowledge is partial and situated. For Baxter and Eyles (1997) trustworthiness requires the researcher to document the methods through which particular and situated knowledge claims that are made may be categorized as ‘confirmable’, ‘dependable’, ‘transferable’ and ‘credibility’.

To illustrate how trustworthiness has been established in this project this chapter is split into five main sections. The first section discusses the research context. The second recruitment strategies of the three target groups; 1) recreational fishers, 2) commercial fishers and 3) fisheries managers and scientists. The third section offers a justification for the research design that combines semi-structured interviews and ‘go-alongs’. Next attention turns to ethics and the positionality of the researcher. Finally, thematic analysis is introduced.

### 3.2 RESEARCH CONTEXT

The research location is the Sydney metropolitan coastal and estuary waters of the East Coast of New South Wales, (figure 2), specifically that of the Hawkesbury River. The reason is twofold. Firstly, the Hawkesbury River, as the longest coastal river in New South Wales, has a long history of drawing fishers to its waters that contain a diversity of fish life (Boon 2017). As such, the river system has become a hub for commercial and recreational fishing, laying just 35 kilometres north of Sydney (Baum 1997). Secondly, the river system contains Mulloway populations where commercial fishers, recreational fishers, fisheries scientists and managers disagree if the species is overfished or not (DPI 2016).



**FIGURE 2: RESEARCH LOCATION, HAWKESBURY RIVER REGION AND SYDNEY SURROUNDINGS, FROM GOOGLE MAPS**

### 3.3 RECRUITMENT AND SAMPLING STRATEGIES

To address the research aims participants were required to identify as a commercial fisher, a recreational fisher or a fisheries manager or scientist; have had interactions with Mulloway either physically or academically, and; be of 18 years or older. Recruitment occurred through both targeted and snowballing sampling and only stopped within the timelines of the thesis. Recruitment began on the 3rd of May 2018 with interviews being held until the 12th of July.

The recruitment process differed between groups of participants. Snowball sampling was essential among commercial fishers. The commercial fishing sector on the Hawkesbury is comprised of around 30 operators. The initial entry point was through a contact of one of the supervisors, which facilitated the building of trust within this sector and recruitment (see Table 1). Given the heightened conflict, apparently some commercial fishers spoke of pressure from the DPI not to participate. One participant said that the, *“DPI told me not to talk to you, but I decided it wouldn’t be a breach because I’m not going to tell you about the negotiations, just my beliefs that I voice daily.”* Clearly, what was said was always situated within the legalities of the current conflict.

Fisheries managers and scientists posed least recruitment challenges through a targeted sampling strategy. This is perhaps for several reasons. First, participating in fisheries management and research is part of many individuals’ work brief. Second, individuals are familiar with university research. Third, emailing is a process paramount of daily activities through which work related information is distributed accounting for quick responses (Whittaker, et. al 2006). Fourth, scientists are positioned as holding the authoritative knowledge. Finally, the supervisors’ network provided opportunities to target fisheries managers and scientists, including attending a conference held at the Sydney Institute of Marine Science. A brief overview of the projects aims, objectives were verbally given to the potential participant. If interest was expressed the individual was asked for their preferred mode of contact, where a Participant Information Sheet (See Appendix 1) was sent at a later time. This saw the recruitment of one fisheries managers and scientists.

In contrast, recreational fishers posed the most challenging to recruit for a project on Mulloway conflict. For recreational fishers, targeted sampling employed primary cold calling strategies including: emailing of three fishing clubs, one online fishing forum, two online fishing Facebook groups, sharing of posts on Fishing Twitter pages and the use of Public Instagram accounts. A brief outline explaining the project, along with the appropriate contact details was posted upon each of the sites respectively (See Appendices 1, 2 and 3). Messages were only sent to individuals who had public accounts. As shown in table 1, the use of the social media sites accounted for most participants from with the recreational fishing group, specifically Instagram. No

recreational fisher contacts were attained through snow balling recruitment, though the use of supervisor’s professional networks were attempted. Recreational fishers appeared to show the least willingness to articulate their perspective on the conflict. This is perhaps because recreational fishing is a leisure activity and understood as “time out.” Alternatively the heightened conflict across the timeline of the thesis may have worked against participation.

**Table 1:** recruitment strategies and success for; recreational fishers, commercial fishers and fisheries managers & scientists.

	Snow balling		Social media		Face to face		Total participants recruited
	Individuals contacted	Individuals recruited	Individuals contacted	Individuals recruited	Individuals contacted	Individuals recruited	
<b>Scientists/managers</b>	8	4	0	0	2	1	5
<b>Commercial fishers</b>	8	4	3	1	0	0	5
<b>Recreational fishers</b>	9	1	14	4	0	0	5

**Table 2:** Participant attributes.

	Age	Gender	Fishing group	Years interacting with Mulloway	Participation	Interview Length
Alex	42	M	Fisheries Manager and Scientist	3	Interview	50 Minutes
Harry	54	M	Fisheries Manager and Scientist	15	Interview	50 Minutes
Sam	65	M	Fisheries Manager and Scientist	50	Interview	2 hours 50 minutes
Todd	52	M	Fisheries Manager and Scientist	25	Interview	45 Minutes
Gerald	42	M	Fisheries Manager and Scientist	15	Interview	45 Minutes
Will	25	M	Commercial Fisher	3	Interview & Go-along	1 Hour 5 Minutes
Rosanne	68	F	Commercial Fisher	40	Interview & Go-along	2 hours 10 minutes
Jim	45	M	Commercial Fisher	20	Interview & Go-along	2 hours 10 minutes
Ian	50	M	Commercial Fisher	35	Interview	1 Hour 30 minutes
Lachie	48	M	Commercial Fisher	12	Interview	1 Hour 5 minutes
Phill	43	M	Recreational Fisher	25	Interview	45 Minutes
Max	30	M	Recreational Fisher	10	Interview	1 Hour 10 Minutes
Tim	37	M	Recreational Fisher	10	Interview	50 minutes
Andrew	40	M	Recreational Fisher	15	Interview	1 Hour 20 mins
Walter	45	M	Recreational Fisher	12	Interview	55 Minutes

Demographic details of participants are provided in table 2. All participants were male, except for one female commercial fisher. They were from a wide range of ages, with the youngest of 25 years old and the eldest being 68 years old. Furthermore, the majority of participants were Caucasian with education levels that ranged from tertiary and postgraduate degrees to incomplete high school certificates. Though education levels were highly varied across participants, within groups it was often consistent. Those who gave up their time to participate in the study were extremely passionate about the subject matter. Consequently, interviews lasted from 45 minutes up to 2 hours and 50 minutes.

### **3.4 MIXED-METHOD APPROACH: SEMI-STRUCTURED INTERVIEWS AND FISHING ‘GO- ALONGS’**

This section is separated into two sections in correspondence with the two stages of data collection; 1) a semi-structured interview and 2) fishing ‘go-alongs’. Each section describes how the methods were employed in this project and the advantages and limitations of each stage.

#### **3.4.1 AUDIO RECORDED SEMI-STRUCTURED INTERVIEWS**

The semi-structured interview was the first and primary stage of data collection. The aim of this stage was to enable participants to offer insights to how they know Mulloway. Semi-structured interviews are widely employed across qualitative research in the social sciences, including geography (Kelly et al. 2010; Longhurst 2003; Kitchin et al. 2000; Dowling et al. 2016). The benefits of semi-structured interviews are well established in the literature (Kitchin et al. 2000). For instance, Weiss (1994) notes that the semi-structured interview may allow the researcher to learn about an individual’s experiences, emotions, life histories and motives through the exchange of stories. This raises important questions around how a semi-structured interview is performed or enacted. A semi-structured interview when conducted as a conversation, rather than interrogation, allows for the breaking down of social hierarchies, where the researcher can be viewed as an equal, rather than a figure of authority (Haynes, 2006). As highlighted by Gubrium & Holstein (2002), the breakdown of this hierarchy allows interviewer and interviewee to both participate in a “joint construction of meaning” promoting deeper and more informative conversations. Interview techniques that



facilitate these deeper conversations is key to reveal insights to the knowledge production process that is understood as situated, social and embodied. These conversations may give voice to ideas and experience rarely heard.

Thus, the use of the semi-structured interview method within this project was appropriate, allowing participants to express their meanings and experiences of Mulloway (Anyan 2013).

The semi-structured interview used in this project was split into four sections, each linking back to the project aim. An overarching question titled each section,

- 1) **At a personal level, what does Mulloway mean to you?**
- 2) **What do you know about Mulloway?**
- 3) **What do you think the threats are to Mulloway?**
- 4) **What do you think the solutions are for Mulloway?**

The four overarching questions for each section stayed constant across the three target groups, though the questions asked within them were modified to resonate with each of the group's characteristics (See Appendix 4). This allowed questioning to be tailored to the needs of the interviewees. The predesigned interview questions were then deployed as starting point for a conversation framed around a series of emerging open-ended questions (Turner 2010). This interviewing technique allows participants to provide as much detailed information as they wish, but also allows for the interviewer to make further inquiries as a means of supplementing the response (Turner 2010). This promoted a deeper and more meaningful understanding of participants' experiences and meanings of Mulloway.

As advocated by Docker (2017), "lighter" or simpler questions were asked at the beginning to ease the participant into more in-depth questions towards the middle for the interview before then reducing the "intensity" of questions at the end. This interview structure allows for more sensitive questions, to be asked, ones that participants may find difficult to discuss, while still ending on a lighter note. In this projects context this meant, for example asking; *"Can you tell me about the type of fishing that you do?"* Before that of *"Do you believe there is a group of people responsible for any trouble*

*seen to be surrounding Mulloway?”* In a project that involves contested fishery knowledges it is essential that participant’s shared how they are situated within the uneven economic, gender and scientific social realms. Overall, participants were enthusiastic to tell of personal fishing experiences that offered insights into their situated knowledges, before answering questions that offered insights to the threats and solutions for Mulloway. Generally, interviews took approximately 1.5 hours. All were audio recorded, with permission from the participant, and were later transcribed for analysis. Audio recording occurred on both an audio recorder and mobile phone.

As highlighted by Carman (2018), fishers’ motives behind interview participation are often threefold. The first, visibility in the eyes of managerial authorities who hold legislative power to allow or restrict access and future access to fishing grounds. The second is to highlight the issues that affect them, outside of the study issue. The third motive, which holds true for the vast majority of cases, is a genuine care for fishing places.

A pilot semi-structured interview was conducted with a Marine Science University Professor. None of the questions were changed, nor the interview structure. That said, the pilot interview heightened the researcher’s awareness that participants may give similar answers to each question if the researcher did not listen carefully to previous answers and encourage participants to reflect upon their given responses.

One unexpected event, but yet common amongst all participants was people bringing out their personal phones to show photographs, when explaining narratives and knowledges within the semi structured interview. As such this photo elicitation, the sharing of understandings through photos, was not prompted by the researcher, but was a research tool that proved helpful in research. Furthermore it highlights that sharing stories through photos is embedded in our everyday, aided by technology.

### 3.4.2 FISHING “GO-ALONG”

The ‘go-along’ is widely used within qualitative research and is employed by geographers and social scientists alike (Harada and Waitt 2013; Kusenbach 2003; Carpiano 2009). A go-along is when the researcher accompanies the participant on an excursion, while at the same time offering possibilities to ask questions. Within this project the participant is often encouraged to lead the way, gaining greater control over the exercise and acting like a “tour guide”. The go-along acknowledges that all knowledge is situated. Interviewing alone, though still a highly useful tool lacks the ability to reconstruct the participants lived experience because they remove people from their settings. The ‘go-along’ draws together two qualitative methods; participant observation and interviewing, into one (Carpiano 2009). Visual, and auditory cues prompt participants to reveal further information as they pilot the researcher through their familiar surroundings. As highlighted by Carpiano (2009) a go-along may inspire greater communication and story-telling by the participant. The go-along was chosen for this project for these reasons, promising to facilitate contextualized understandings where the researcher can observe firsthand the participants lived experience. Furthermore, the ‘go-along’ offered possibilities for participants to convey their embodied knowledge through showing rather than telling researchers what they do (Kusenbach, 2003; Carpiano 2009; Riley et al. 2007; Cain, 2011). As such, this has the potential to facilitate deeper understandings, in the research context, to be made about the participant.



**FIGURE 3:** RESEARCHER ON TRAWLER GO-ALONG. PHOTOS BY MICHELLE VOYER.

In this project, the ‘go-along’ offered all these possibilities, enriching understanding of how participants understood the Mulloway through not only what they said, but also what they did; and the possibilities of opening moments of reflecting on personal fishing biographies through the presence of and encounters with lines, reels, fish and ocean. Yet, in this project, the majority of participants declined the invitation to participate in a ‘go-along.’ Only three participants accepted this invitation from the total of 15 participants. The biggest challenge of the go-along, in this project, occurred at the consent level. For commercial fishers the explanation was provided as concerns for health and safety. The constrained space of the deck, for most commercial fishing vessels, positioned the researcher as an immediate hindrance to work and a safety risk. For recreational fishers the ‘go-along’ may be in part explained by how fishing is understood as ‘time out’, ‘secret spots’ or within the bonds of mateship. For manager and scientific fishers, there was a lack of fieldwork occurring over the period this project unfortunately resulting in no go-along with fisheries managers and scientists.

The three participants that did consent to the go along were all commercial fishers. Two of those individuals were recruited via professional networks, and the other via the social media platform Instagram. Consistent reactions to the semi structured interview and go-along were evidenced by participants conveyed their industry knowledge by adopting a ‘teacher’ role. The researcher was taught how to fish for Mulloway, techniques used in prawn trawling, how to sort and release by-catch appropriately and the workings of the Sydney Fish Markets. Hence, the go-along enriched the semi-structured interview through the possibilities of working alongside the participant and spontaneity of the conversation surrounded by fish. Box 3.1 and Box 3.2 provides insights from the personal research diary of the researcher to illustrate the benefits of the ‘go-along’ style interview.

#### Box 3.1 Sydney Fish Markets go-along.

I received the message from Will agreeing to partake in the interview and go-along mid-way through the day. We were to meet at the Sydney fish markets at 6:30pm where Will would unload, ice and pack his days catch for the next morning's markets. We had organised to meet the week prior, though Will had not caught enough that day to make the trip to the markets worth the drive.

I was in at Uni, so I jumped on the next train north and headed to Sydney. I had driven passed the Sydney Fish Markets during the day many times before but at night it was a completely different place. Bobcats hummed around and the carpark was now a sea of flashing red lights. Everyone was busy doing their own job. I finally spotted Will, I introduced myself formally and we began to chat. Will had apologised for rescheduling our meet, he had blamed it on the temperamental practice that is fishing. I had assured him there was no need to apologize and thanked him again for agreeing to meet. Will gave me a high Vis jacket we grabbed his eskies and headed inside the market building. It was much calmer inside, a welcomed change from the hurry outside. My eyes were first drawn to the huge market floor where a large number of blue boxes full of fishers catch ready for the next day. A large stainless-steel box was filled with ice stood in the corner, we headed there. Will began to unpack his catch, there were 7 eskies all brimmed with prawns. He chuckled and we agreed he had had a good day on the boat. Will let me help with the packing and icing of the prawns where it was appropriate whilst I conducted the interview. The Sydney Fish Market setting inspired large amounts of discussion of the economic drivers behind commercial fishing. Will explained that there is much more to consider as a commercial fisher then just catching a species; "You don't want to flood the market." Will self-proclaimed himself as a savvy fisher, where he would catch species at the times where their price per kilo were high. We continued to explain that if you catch too much of one species, and everyone else is doing the same thing, you don't make any money from it because the price per kilo plummets. These were factors I had not yet considered and was glad Will could explain them in a setting that made it much easier to understand.

### 3.5 RESEARCH DIARY

Throughout this project a research diary was employed. Scholars have long employed the use of a research diary to establish rigor within qualitative research (Nadin and Cassell 2006; Burgess 1981). The keeping of a research diary allows the researcher to clarify personal thoughts and ideas allowing for ongoing reflection throughout research. It also encourages the recording of interviewee's responses and reactions to aid further understandings during the analysis process. As stated by Clarke (2005) research diaries supports research transparency. Through the inclusion of experts within this research it allows for greater transparency, where the reader may track the thought processes involved in both the research and analysis stage of the project.

In this project, the use of the research diary fulfilled several roles. Firstly, to document ideas, observations on go-alongs and after interviews. Secondly, to chart how the positionality of the researcher changed across the project, and thirdly, to critically reflect upon the social power relationships. Research diary excerpts are present throughout this thesis.

### Box 3.2 Experiential learning outcomes for a trawling go-along

Today was my first interview and go-along. I woke up at 3:00am and headed for Lower Portland where Michelle and I were to meet Jim and Roseanne on Jim's wharf at 5:30am. The roads are empty as I left Sydney. I was so excited and nervous; it finally feels like this project is underway. I arrive at Jim's around 5:20am, it is still pitch black, and I can see a torch waving around. I jump out of my car and introduce myself to both Jim and Roseanne; it is freezing and the fog coming from our mouths masks our introductions. Michelle soon arrives and we head down to the water. The Hawkesbury is still, silent and beautiful. Jim's boat is much larger than I had anticipated. I later learned that he built it himself over the course of a year.

Jim starts the engine and we head out onto the river, the early morning fog is starting to rise. Jim and Rosanne don't hold back, and straight away passionate discussion on Mulloway and the treatment of the commercial industry begins, there is anger in their voices. I'm nervous; I don't want to ask foolish questions and I want to ensure I present myself as an informed individual. I just listen. Jim then seamlessly puts out his nets, you can tell he has done this before, I'm sure he could do it with his eyes closed. I think I had originally thought that all trawling would be a much grubbier, chance driven practise, but Jim does it in a precise, meticulous manner that at first astonishes me. The nets and ropes move through Jim's hands smoothly and effortlessly. Jim shows me the technology he uses to gauge net depth. He begins to explain; if the net is too high you get fish, if it's too low you get fish and sticks, the middle is where you get prawns. Jim ensures me that all questions are welcome. I relax a little and our conversations begin to flow.

Jim brings the net up and Roseanne begins to teach Michelle and I how to remove by-catch from the shot of prawns. We don't remove a single mulloway juvenile or adult, just bream and sole, though Jim admits that they do occasionally see a few in their nets. Like a well-oiled machine Jim begins to size his prawns, and ice them on the boat. I'm startled to learn that all of these prawns will go to bait for recreational fishers and won't be for human consumption. To me it seems rather ironic.

4 more shots follow and then we begin to head back to the wharf. On our way there we pass another prawn trawler who asked us how much we have caught. Jim over exaggerates. He laughs and we continue to head back. Jim and I take the boxes of prawns off the boat and place them on the tractor that waits on the shore.

Jim brings out a fishing rod he had set up and asks if I would like to have a fish off his wharf. I enthusiastically take up his offer. Jim shows me where to place my hands when to pull up on the rod and within 5 minutes I have caught 3 Bream. I am as shocked as anything! We laugh that fishing will be my fall back if this project becomes a disaster.

Jim invites me to view his nets, and their exclusion devices. We stretch them out on the grass and Jim and Rosanne explain in which conditions each of the nets are used. There are many more factors than I had first thought that are involved in choosing the right net for the day.

I thank Jim and Rosanne for their time and effort and begin my drive home. As I drive home I feel inspired, but I also feel guilty. I think in the back of my mind I had expected some questionable practices to be occurring aboard the trawler. Jim and Rosanne had been welcoming, educated and seen to be abiding by all regulations.

### 3.6 ETHICS AND POSITIONALITY

#### 3.6.1 FORMAL ETHICS APPLICATION

Research ethics raises questions about the decisions researchers make to protect the welfare of participants and researcher throughout research (Dowling, 2010). In this research project, ethics was addressed through the formal ethical guideline provided by the University of Wollongong (UOW). At UOW, all research conducted must lodge a formal Ethic Application to the Human Research Ethics Committee (HREC). Identified in the application to Human Research Ethics Committee were conceivable risks to participants and researcher. Strong ethical practice foresees and responds to ethical dilemmas, as to meet the needs of the participant on a case-by-case basis (Ritchie et al. 2013). As such, continuously personal reflectivity was employed throughout the project, to reflect on personal ethical practice and engaging in discussions with research supervisors. In this project design careful attention was given to ethical considerations surrounding privacy, confidentiality and informed consent. Ethics was approved on the 1st of May 2018 (Ethics Number 2018/217).

#### 3.6.2 RESEARCHER POSITIONALITY

An individual's sense of self, who they are and how they view themselves in relation to others is known as positionality. Positionality molds an individual's understandings of others and how they view the world. As such, questions surrounding knowledge emerge to question the way we view 'knowledge' and to ask; what knowledge is, how is it created and whose knowledge is reliable and can be trusted. These questions have long been asked in social science, where the branch of epistemology denotes itself to the philosophy of knowledge (DeRose 2005; Harding 1992). In a research context, as argued by England (1993), the researcher's biography and positionality can directly affect fieldwork for all knowledge is socially situated. Therefore, critical reflexivity is a key consideration, as positionality will shape all research. In this project, all prior understandings of Mulloway, Recreational Fishing, Commercial Fishing and Fisheries Science and Management would have seen the asking and answering of questions delivered in a certain way. This, emphasising the need for ongoing reflection throughout this project, to acknowledge the social power relationships at play.



To establish reflexivity a brief summary of my relationship to the project is given below.

Box 3. 3 Positionality statement. April 28<sup>th</sup> 2018.

I would describe myself as a young Caucasian female. I have always been fascinated in human-nature interactions and I thought these would be best studied in a conservation biology degree. Though at the end of my third year, with honours looming, I realised that human-nature interactions were always in the background but never at the forefront of conservation research. This had always frustrated me, for it seemed the most important interaction to get right. So I made the switch to human geography.

I grew up on the south coast of NSW and spent my summers equally in the river and the ocean, snorkelling and occasionally spearfishing and fishing with my father and siblings. I was never very good and my father has a pool of embarrassing fishing stories that often tells when we have guests at dinner. I had never ‘loved’ fishing, but I did love holding the fish in my hands or when my dad would let me put “the little ones” back. Though prior to this study I had no knowledge of the existence of Mulloway, and I had never eaten much seafood. As such I didn’t often think about others who fished or indeed recreational or commercial fishers other than passing thoughts of the terrors of overfishing I’d seen in the media.

All I knew was I loved the water and I wanted to learn about human nature interactions, stumbling upon this project seemed like a godsend. I wanted to learn about talk to the people, who fished, why they fished, how they fished and why Mulloway was so important to them; a fish that until recently I hadn’t known existed.

### 3.7 THEMATIC ANALYSIS

Thematic analysis was guided by the political ecology framework (outlined in Chapter 2). Analysis required coding of transcripts through repetitive reading of the transcripts. Each transcript was coded for insights to economic relationships, sets of ideas that sustain understanding of Mulloway and the uneven social relationships. The transcripts were coded alongside the research diary notes.

### 3.7 CONCLUSION

The aim of this chapter is to demonstrate how progress towards trustworthiness in the knowledge has been established in this project design. The knowledge is situated from the Mulloway conflict arising in the Sydney metropolitan coastal and estuary waters of New South Wales, Australia. Recruitment across three target groups in the timelines of the thesis was always going to be ambitious. Constraints upon participation were perhaps further by the heightened tension around the introduction of new fishing

legislation as thesis was being conducted. Positioned outside of recreational fishing circles, this group was the most challenging to recruit despite the diversity of strategies. Similarly, the possibilities of combining semi-structured interviews and ‘go-alongs’ was constrained in a project on fishing by the timelines of the thesis. Equally, the researcher remains alive to how the knowledge is always partial and situated by the positionality of the researcher, who arrived at this project trained in conservation biology but with no recreational or commercial fishing experience. The next two chapters offer an interpretation of the Mulloway conflict through thematic analysis informed by political ecology. The first results chapter addresses the question: ‘Is there a problem?’

## CHAPTER 4: IS THERE A PROBLEM?



## 4.1 INTRODUCTION

This chapter seeks to uncover and understand the conflict that surrounds problem definition through addressing the first aim of this thesis; what knowledges surrounding Mulloway exist? Specifically this chapter seeks to understand disputes over whether Mulloway stocks are in decline and the extent to which the problem is understood to be 'real.' Following the theoretical framework of political ecology this chapter is structured into 3 key sections. The first, addressing economic relations where light is shed on the modes and relations of production through which individuals come to know Mulloway. The second; environmental relations, turns its attention to individuals environmental perceptions. The third and final section shifts attention to the social relations that enable social hierarchies to be formed and known.

## 4.2 ECONOMIC RELATIONS

There were considerable differences in the extent to which the three groups of interview participants agreed with the idea that Mulloway are 'overfished'.

Fishery managers and recreational fisheries agreed there is a problem, specifically of over fishing. For fishery managers, the problem was understood in terms of Maximum Sustainable Yield (MSY). This is a term used widely within fisheries management, and refers to the optimum level of productivity within a fishery, where the population size is at the point of maximum growth rate. This is achieved through setting annual catch limits at the highest point that can be sustained over time keeping stock levels constant. The United Nations Convention on the Law of the Sea, is also seen to recommend this, where it outlines that governments must gather scientific information to set acceptable catch limits to maintain and support maximum sustainable yield (UNCLOS, 1982).

As stated by Todd, a fisheries scientist, to generate MSY *"what you want to do is to remove a proportion of those older individuals to make room for the young, fast growing ones so that they are able to recruit, their access to resources but of course you want to get the balance right."* For most fisheries MSY is considered to be around the 20% margin of original population. According to the DPI, Mulloway stocks are at 7% of original population. Given the evidence of the MSY, the accepted position with the scientific community is that Mulloway stocks are overfished. Again echoed by Sam, a fisheries manager and scientist *"there are definitely less Mulloway there right. Now is that a problem? Not if you are a fisheries manager it's not, because the goal for*

*fisheries management, normally, is to produce the maximum sustainable yield.*” Sam understands that there are less Mulloway, though from a fisheries manager perspective this can be easily managed.

Likewise, among the recreational fishers interviewed, they were more likely to agree that Mulloway stocks have declined; as explained by Tim *“they have definitely declined over the years”* and again by Max *“stocks have been smashed.”*

In contrast, the commercial fishers interviewed largely believed that the Mulloway stocks are in good health. For example, Ian said; *“there are millions of them”*, likewise Lachie said, *“there is no shortage of them, we are seeing tonnes.”* When commercial fishers were asked if they believed the stock levels given by DPI to be correct some answered as simply as *“Nup, there is still plenty (of) Mulloway”* (Will).

This suggests a fundamental aspect of the conflict over Mulloway lies in the extent to which different actors agree that species decline is ‘real’ and the seriousness of the decline. To help explain the difference between the position of commercial and recreational fishers, the different modes and relations of production that enable Mulloway to be caught were examined. These different modes and relations of production result in different knowledge of the fish that is caught to fulfil very different requirements but always underpinned by capitalist relations.

Alex, a fisheries manager, offers insights into how the sets of economic relations established with Mulloway through practices of catching fish are more likely to illustrate a decline in Mulloway stocks for recreational fishers. In his words:

*If you look at the way the 2 fisheries operate. Commercial fishing uses techniques and gear that is aimed at catching as many fish as possible so a fishery can be fished down to a level that is still sustainable from a commercial fishing perspective because they can still catch fish and the fishery is not completely screwed, it is sort of half way decent so they can still get their catch and make their money. BUT from a recreational fishing perspective because we are just using a hook and a line that it is a very inefficient way of fishing we need a more abundant fishery to be able to get the same sort of experience that we want to get. So when we get recreational fishers out there fishing hard, investing money in their chosen sport and just not getting the results that they think they should be getting over a long period of time they will start saying well okay the commercial guys are destroying the fishery (Alex).*

Alex illustrates how the fishery is embedded in different workings of capitalist relationships. Alex suggests that these different capitalist conditions under which Mulloway are caught are integral to understanding the differences in perceptions over whether the species is in decline, and the extent of that decline. Alex understands that commercial's nets and fishing practices are designed to maximise economic efficiency – that is to catch the largest possible number of fish, at the least financial, labour, time and environmental cost. The commercial fishers interviewed are able to catch their “usual” amount of fish where “they can still get their catch and make their money” as understood by Alex. This contributes to their belief that Mulloway stock levels are still in good shape, as they have seen no change to their catch, or they attribute changes to other environmental factors or seasonal variations.

From a recreational fishing side, and as highlighted by Alex, because recreational fishers are “using a hook and a line that it is a very inefficient way of fishing” the sector “needs a more abundant fishery to be able to get the same sort of experience.” This illustrates how Alex understands recreational fishing in terms of economic productivity. Hence, a rod and reel become understood as ‘very inefficient way of fishing,’ seeing little return in terms of fish numbers. Instead, modes of production for recreational fishing are designed to maximise the experiential dimensions of catching the fish. In this context recreational fishing is understood as a ‘commodified’ experience, involving significant investment in rod and lines, as well as fisher - time, for a much smaller return in terms of fish catches. This can be as few as only one or two fish, or even no fish at all, in one fishing outing. The economic investment of recreational fishers therefore centres not on the fish itself but the anticipated experience of catching the fish, and demands a much larger fish stock to remain practical. Failure to secure the promised experience, according to Alex, results in a greater acceptance of the idea that there is a ‘problem’ with fish stocks. How a recreational fisher or a commercial fisher come to know and interact with Mulloway, and the modes of production that allow them to do so, therefore feed differing knowledges and perspectives of Mulloway.

### 4.3 ENVIRONMENTAL RELATIONS

The environmental knowledge of each stakeholder, and the perceived knowledge of other stakeholders, is another key to understanding why some perceive there is a problem, while others do not. For example, within the commercial sector, participants spoke about their knowledge of Mulloway as more accurate than that of both recreational fishers or fisheries managers and scientists. Thus, commercial fishers tended to discredit the arguments of both these sectors.

As understood by Jim, a commercial fisher, the majority of recreational fishers lack the environmental knowledge that is needed to consistently catch Mulloway at rates they believe they should. *They don't know what they are doing, they don't know enough about the fish. People think you can go and buy the most expensive fishing rod and boat and buy a packet of bait and go down the river and if you aren't catching a fish then there mustn't be any there. You see, they say 95% of the fish are caught by 5% of the fishers. But we are out there every week; we aren't just throwing a net and hoping for the best. We know what we are doing. (Jim)*

Jim positions commercial fishers as individuals who possess vast amounts of knowledge about the Mulloways obtained through weekly interactions and targeted fishing practices: “*we are out there every week; we aren't just throwing a net and hoping for the best. We know what we are doing.*” In contrast, recreational fishers, as explained by Jim, investment in the, “*most expensive fishing rod and boat*” is never the equivalent of time on the water. Without sustained engagement, recreational fishers cannot obtain the environmental knowledge needed to successfully fish; “*they don't know enough about the fish*” (Jim). The key environmental knowledge that Jim understands the majority of recreational fishers to lack includes: where to fish, or what time to fish, what bait to use and when species migrate. Consequently, Jim suggest declining fishing stocks becomes one way that recreational fishers justify why they have not secured the amounts of fish that they had expected in return for their fishing equipment and time investment. Jim understands that recreational fishers rationalise their lack of catch with the belief that Mulloway stocks have declined “*there mustn't be any there.*” Yet, according to Jim, the stocks have not declined and the recreational fishers' perception of the decline is fuelled by their inferior knowledge of Mulloway. Consequently commercial fishers' understand that they are then viewed, by recreational fishers, as a problem and cause of the perceived decline in stocks.

Likewise, fisheries knowledge born of weekly physical engagement with the fish is employed by commercial fishers to discredit and question the knowledges of fisheries managers and scientists. Some commercial fishers position scientific environmental knowledge as too abstracted from the physicality of fishing. As expressed by Ian, a commercial fisher;

*“Because we would like to have someone in fisheries that is hands on, like what you’re doing, they come out in the boat and they see us packing the fish at the co-ops. We don’t want someone who is just going to come and go - oh yeah I know it all - but they’ve never done anything because it’s all on paper but our job isn’t on paper, it’s out there” (Ian).*

Here, Ian understands fisheries managers’ and scientists’ environmental knowledge to be inadequate. This is due to the modes through which Fisheries Managers and Scientists come to learn about Mulloway, and fisheries in general, which is considered to be theoretical knowledge only *“it’s all on paper.”* According to Ian, theoretical environmental knowledge can only go so far. For Ian, to truly understand fisheries, specifically Mulloway, fishery managers must *“come out in the boat”* or to *“have someone in fisheries that is hands on.”* Hence, Ian discredits fisheries managers and scientists for their lack of practical engagement in fisheries that ultimately results in the discrediting of the scientific claims that Mulloway stock levels have declined. This acts to consolidate Ian’s view that Mulloway stock levels are not in decline and that in fact *“there are millions of them.”* Ian prioritizes his immediate sensory experience over the measures that inform fisheries management. Ian is not the first to challenge fisheries management by prioritizing sensory experience (Planyi 2012).

Lachie, a commercial fisher, echoes this again. In his words;

*“And that’s what people don’t see, but when you are sitting on a hill looking out you can see the enormous schools of fish. But the normal person on the river or on the boat doesn’t see that. Because they aren’t looking for it” (Lachie).*

Lachie expresses similar views to those held by both Ian and Jim. Here Lachie expresses his knowledge and experience to be above a degree that he considers to “normal.” Thus, in fact commercial fishers can see *“what people don’t see,”* and their knowledge of Mulloway, and fishing as a whole is far superior compared to a “normal person.” Subsequently Lachie’s understanding consolidates his belief that Mulloway



stocks are in good shape as he “*can see the enormous schools of fish*” that others simply cannot.

#### 4.4 SOCIAL RELATIONS

Social hierarchies influence the extent to which knowledge is co-produced, trusted or dismissed. Social hierarchies are seen throughout society and are learnt from an early age. Individuals understand and look for the social cues that suggest who is better or who smarter (Koskin et al. 2015). As such, through the identification of these social cues, individuals are influenced to comprehend who is a suitable person to listen to and to take direction from. For we want said person to possess the skills and traits that we consider to be the most crucial or desirable (Koskin et al. 2015). Thus ‘evidence’ can be interpreted differently by different actors according to the relationships they have with the suppliers of that evidence. This was clearly evident in the responses of commercial and recreational fishers to the questions of ‘is there a problem?’

Amongst the commercial fishers interviewed there was a general sense that fisheries managers and scientists are viewed by the general public as the ‘elite’, whilst commercial fishers consider themselves as treated like an ‘underclass.’ For some commercial fishers, this social hierarchy cultivates mistrust and raises further questions about the validity and motives behind the science.

The mistrust between commercial fishers and fisheries managers can partially explain the response of fishers to the science, which has underpinned the contention that Mulloway are overfished.

The following excerpt from Lachie’s interview illustrates how the evidence provided by scientific managers is questioned and challenged:

*Have you got the graph on the Mulloway? It starts about 1970 there is a major thing to look at then because you see in 1970 you’ve got this massive catch of fish, but it doesn’t say on that graph that back in 1970 there were 5000 commercial fisherman in NSW. But now we are down to 970 fishermen in NSW, they’ve been pushed out because they couldn’t make enough money or they got old.... so there has been a depletion of 80% of the fisherman. There were a lot fewer fishermen out there SO there would have to be a reduction in jewfish catch seen. This graph is really important to explain to you. Back then there was no size limit. (1970) So anyone could catch any sized*

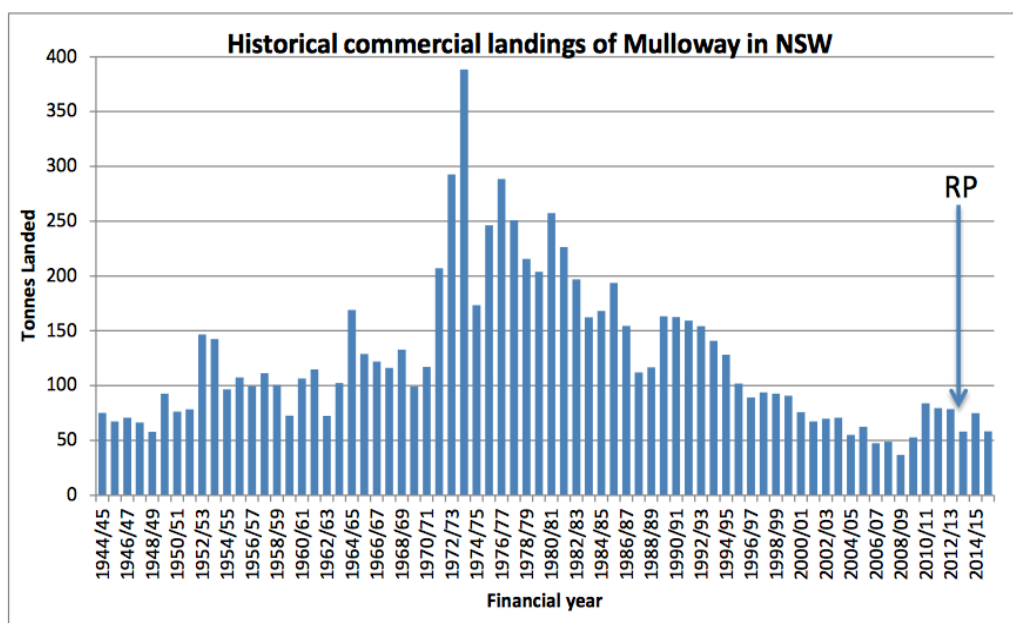
*Jewfish, which is ridiculous and its stupid they could catch them really small and still market them... but then somewhere in the 80's, the size limit of 38cm was put onto mulloway, which automatically changes the amount of catch seen. Because now people can't catch everything they will have to throw back the small ones. That is another reason why the catch has come down. There are a lot of factors. So as the years went on they didn't believe the Jew fish size limit was sufficient so in the 1990's the size limit was put up to 45cm. Another reason the graph goes down again for catch rates because these fish people were once keeping they can't keep anymore. And then about 5 years ago that had the Mulloway Recovery program kicking off and the size limit went straight up to 70cm and the commercial guys can keep 10 fish between 45cm and 70cm. When there are 45-70 restriction fish came in the biggest catcher on the Hawkesbury, Tony Jones retried (pseudonym name). So you see again the catch rate drops because Tony isn't working. And that might not sound like much but we are talking in the tonnes every year. All these other things that have gone on that aren't explained by fisheries so the graph isn't right, they are leaving factors out...they are grubs. (Lachie)*

In the previous excerpt Lachie, a commercial fisher, refers to the graph produced in DPI's 2013 "Monitoring and assessment of the impact of management changes under the Mulloway recovery program," which can be seen below in Figure 1. Lachie discusses the portrayal of scientific knowledge and how, in this example, Lachie understands the portrayal to be un-true and ill-informed. In particular, Lachie contends that the scientific reporting did not accurately consider social influences on the data including:

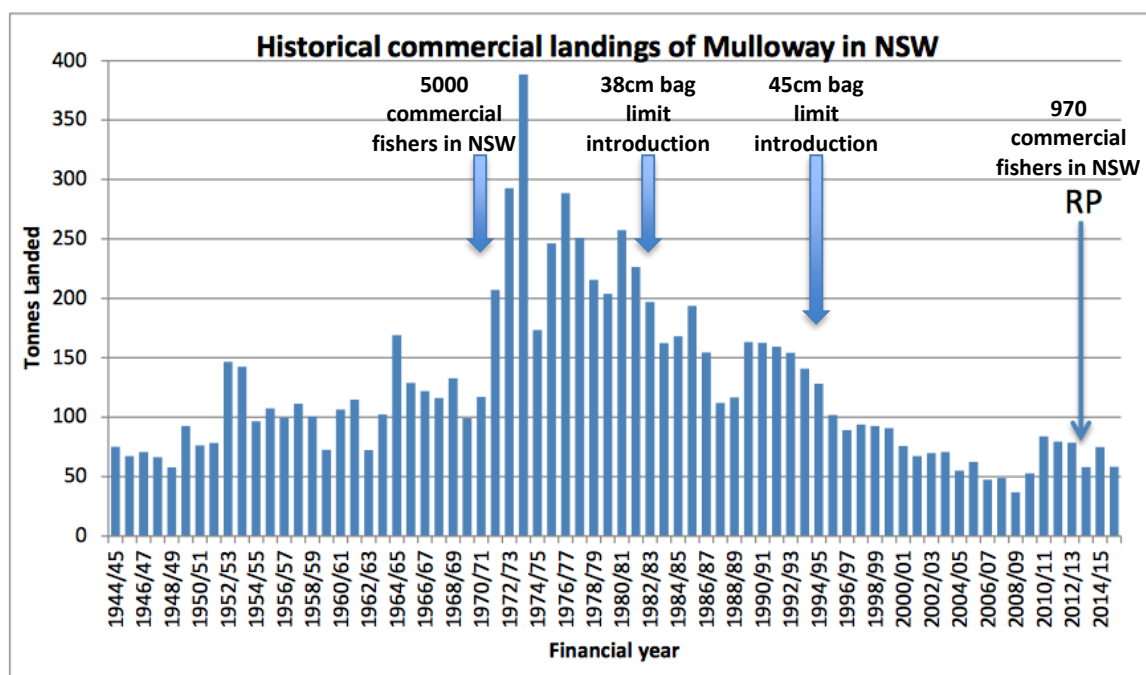
- The number of fishers (*"back in 1970 there were 5000 commercial fisherman in NSW. But now we are down to 970 fishermen in NSW."*)
- Changes to fisheries regulation and management (*"then somewhere in the 80's, the size limit of 38cm was put onto mulloway, which automatically changes the amount of catch seen"*), and
- The influence of individual fishers and fishing practices: (*"So you see again the catch rate drops because Tony isn't working. And that might not sound like much but we are talking in the tonnes every year."*)

It is clear that the figure discussed by Lachie does not fully explain the full range of influences on fish catches over time. In fact, for Lachie, the graph should look like Figure 5, only then can the correct representation be made and where it can be ensured that “*leaving factors out*” does not occur.

Fisheries science, does however, have tools through which changes in catch ‘effort’ can be accounted for in estimating catch levels over time. Catch per Unit Effort (CPUE) is a modelling tool used as an indirect measure of target species abundance, in relation to the amount of ‘effort’ exerted to catch target species stock. As such, it can be used to give a clearer indication of the rate of catch that occurs in relation to the amount of effort that is applied upon a stock. Though this tool is used widely throughout fisheries management it is absent from the graph provided by DPI (Figure 4). The absence of CPUE within the graph fuels Lachie’s understanding that the Figure 1 is a not a truthful representation of what is actually happening to Mulloway stock levels, that “*the graph isn’t right, they are leaving factors out.*” In fact, as understood by Lachie, these “*factors*” are social relations that have not been identified, and incorporated by fisheries. Notable CPUE calculations are seen within other sections of the DPI report, thus highlighting how particular aspects of evidence are adopted or rejected by different actors for different purposes. All these points described by Lachie also highlight the mistrust that is present between fisheries managers and scientists and commercial fishers, which is ultimately fuelling the rejection of scientific knowledge produced by fisheries managers and scientists. The formation of trust and collaboration between stakeholder groups is known to be an integral part of reducing environmental conflict. More specifically, trust of institutions, in this case: fisheries, has been seen to influence the way an environmental impact is perceived and understood (Avci et al. 2010).



**FIGURE 4:** TOTAL REPORTED COMMERCIAL LANDINGS OF MULLOWAY IN NSW. RP INDICATES THE MULLOWAY RECOVERY PROGRAM (DPI, 2013).



**FIGURE 5:** TOTAL REPORTED COMMERCIAL LANDINGS OF MULLOWAY IN NSW. RP INDICATES THE MULLOWAY RECOVERY PROGRAM (DPI, 2013). ALL OTHER INDICATORS BASED UPON LACHIE'S INTERVIEW, ONLY FOR EXPLANATORY PURPOSES.

Contrastingly, for some recreational fishers and fisheries managers and scientists the data within DPI reports were used to confirm their beliefs surrounding Mulloway's decline, and to call for change in the fishing pressure placed upon them. Tim, a recreational fisher said;

*"The latest data source I dissected quite heavily, obviously because I have been to the minister to ask for things to be changed... the data is so concise... they [Mulloway] are at a critical point in their biomass which is very low"*

Tim demonstrates a much higher degree of trust in the data provided by the DPI, which affirms his belief in Mulloway's decline and drove his desire to call *"for things to be changed."*

As such it become evident that different individuals and groups are seen to perceive scientific data in different ways. In this way, science can also be used to advocate for opposing sides that are involved in environmental conflicts and is mobilised to advocate differing views. This confirming the trends already present in the literature (Collingridge and Reeve 1986).

What also became evident was that the social relations between recreational fishers and fisheries managers and scientists appeared to be quite different to the relationship observed between commercial fishers and fisheries managers and scientists. Recreational fishers and fisheries managers and scientists appeared to be on more of a level playing field, thereby mutual trust and respect was apparent. All fisheries managers and scientists interviewed within this project identified themselves as participating and enjoying recreational fishing activities. Alex, a fisheries managers and scientists would often refer to recreational fishers as "we," and commercial fishers as "they." In his words;

*"I don't think it is fair to say they [commercial fishers] are the only cause, rec fishers take a lot of fish and there are more of us and WE do catch a lot of jewwies. So fair enough that we take a bit of responsibility for that as well."*

Thus, Alex includes himself amongst recreational fishers, this acting to exclude himself from commercial fishers. As such use of such language contributes to the othering of commercial fishers.

## 4.5 CONCLUSION

This chapter revealed a wide array of knowledges between participants in relation to both Mulloway itself, and the perception of Mulloway stock numbers. Recreational fishers, fisheries managers and scientists understood Mulloway stocks to have declined, while commercial fishers disagreed. Groups, to advocate and confirm their opinions or indeed to discredit the opinions of others, used Science. Fisheries scientist and managers should be alert to the notion that different groups and individuals will interpret data in contradictory ways.

## CHAPTER 5: “WHO IS TO BLAME?”



## 5.1 INTRODUCTION

Building on chapter 4 this chapter seeks to uncover and understand the conflict and blame that surrounds Mulloways decline. This is achieved through addressing the remaining two research questions of this thesis. The first: how do differences in knowledges contribute to the conflict between stakeholder groups? The second: how are some people/groups knowledges prioritised over others? Specifically this chapter seeks to understand who or what is understood to be the cause of Mulloway's decline and why. Again following the theoretical framework of political ecology this first three key sections address the economic, environmental and social relations of knowledges and how these shape conflict. Two further sections that address mechanisms through which conflict is sustained and ingrained in a historical sense then follow. Various knowledges were uncovered where disputes over who bears responsibility for the problem and ultimately who should bear the brunt of the mitigation efforts, which were both complex and diverse.

## 5.2 ECONOMIC RELATIONS

The allocation of blame for declines in fish stocks is intrinsically link to competing capitalist objectives for growth. Both recreational and commercial aspects of the Mulloway fisheries seek to protect and grow the economic benefits obtained from this fish as a resource. For both groups the notion of blame can be a means of shifting responsibility for the problem away from themselves, in order to allow for this continued growth in their own sector. Of particular significance to the conflict over Mulloway, is the rising popularity of the species to recreational fishers, who now catch similar numbers of the fish as commercial fishers. This rising value of the fish as a commodity amongst recreational fishers was discussed at length by the recreational fishers interviewed, and assists in understanding the debate about who is to blame for the species decline.

As outlined in the previous chapter, recreational fishers position themselves as skilled craftsperson in the art of fishing. Like all skilled craftsperson's, recreational fishers are perceived to be continuously looking for ways to improve their craft, gaining new knowledge and on the hunt for new technologies. According to Tim, a recreational fisher, tackle company manager and fishing author, Mulloway is increasing prized by



recreational fishers, with species subsequently valued highly by the recreational fishing industry. In his words:

*“In Google search terms on the internet for NSW they are the number one searched fish. It alternates between Mulloway and the Murray Cod in Google search terms. And that’s people searching “HOW TO CATCH A MULLOWAY, WHERE TO CATCH A MULLOWAY, WHERE DO MULLOWAY LIVE?” we search that with our business here so we know where to sell our tackle, what tackle to design..... in years gone past it was probably Flathead that would always rank up the highest..... BUT it is now nearly always now Mulloway”*

Tim speaks to the popularity of the Mulloway among recreational fishers, and infers that trends exist amongst recreational fishers to catch particular fish, with Mulloway currently leading the latest trend. Max, a sponsored recreational fisher, again voices Mulloway’s popularity among recreational fishers;

*“Everyone loves to read about them, Magazines fly off the shelf when there is a big Mulloway on the front cover. They sell out like “THAT.” Sponsors will ask me for videos, for articles, tips and tricks because there is a massive interest in it and it makes them money” (Max).*

Time and Max highlight that fishing for Mulloway is not only a commodified experience for recreational fishers, but beyond that, it is also an experience to be cashed in on by business enterprise. This is achieved by monitoring the aspirations of recreational fishers and altering production accordingly; as to “*what tackle to design.*” Tim continues;

*“There is a reason why it features on the cover of Fishing world, which is the most circulated magazine in NSW, and the reason that photo is on the front (OF MULLOWAY) is because it sells..... People want to catch that fish and every time I get asked to do an article about Jewwies he (magazine editor) does tell me that the numbers are way up (magazine sales).”*

Tim understands fishing magazines to be a mechanism, through which knowledge of Mulloway is marketed to the fishing community, and as such the magazine has the power to influence fishing trends, the knowledge of those who read it, and indeed what fish are targeted. The knowledge circulated through the Internet and fishing magazines

are integral to better understand why recreational fishers may prize Mulloway, and learn more of potential fishing locations and techniques. Indeed, for many recreational fishers interviewed in this project, the way they came to know Mulloway, and to further their knowledge of the fish, was through fishing magazines.

# FISHING

## How to catch mulloway

By Chris Cleaver | 8 July 2018

JEWFISH, also known as mulloway, have become such a sought-after and targeted species on the east coast of Australia...

When I started my quest for jewfish 20 odd years ago it began with soaking squid baits around some of the local beaches in the Illawarra and Shoalhaven area. Results were as expected for someone with no experience catching these prized sport fish. There was no internet and no chat rooms, so learning some secret tips was virtually non-existent apart from fishing magazines like this one. I guess that's why I hold some loyalty toward the print media publications such as *Fishø*; I did learn a lot and was inspired to keep me going back...

### **Bait or lure?**

Both are equally as productive, but a few factors will determine where to concentrate your efforts. This doesn't mean you can't do both, especially if you have some baits out with the trap set. However, I do find a dedicated effort to one or other yields better results.

If you're fortunate enough to have a boat with an electric motor then you're well equipped to go down the plastic or soft vibe path. The electric motor will allow far better positioning and a level of stealth while probing casts around a likely area. Work the bottom third of the water column with either a single or double lift and then allow the lure to rest back down before commencing another lift. Any

**FIGURE 6:** EXCERPT FROM FISHING WORLD MAGAZINE. JULY 8, 2018

A trend may be established through the production and circulation of knowledge, and how these knowledges transcend through society. In this case, the circulations of both environmental and social knowledge surrounding Mulloway are key drivers that have seen the increased popularity around the fish. Trends tend to trickle down from those in the “know” to the majority. Here, those in the know are characterised by high levels

of environmental knowledge of Mulloway. These environmental knowledges are specifically in relation to how to catch the fish; tides, bait, lures. Though beneath that, this environmental knowledge held by recreational fishers a deeper understanding of marine food chains, and the life histories of Mulloway.

Mulloway can be considered as part of trend or fashion, with growing popularity linked to important economic drivers and increased pressure on the species, as highlighted by Tim:

*I mean in years gone past there have probably only been selected people that would learnt how to fish for it..... BUT now with the advances in technology and the increased popularity that are happening so quickly it has probably greatly changed the pressure on that species” (Tim)*

Yet the growth in this trend is constrained by the limits in the resource – that is economic growth associated with the increased popularity of Mulloway can be seen to be constrained by resource scarcity. Resource scarcity is seen to drive environmental conflict (UNEP 2012; Libiszewski 1991). Scarcity can be triggered when increased pressure is placed upon a resource. The tensions that arise from increased pressure, in turn, can often result in the inflammation in conflict between stakeholder groups. As understood by Tim, the increased popularity in Mulloway has “*greatly changed the pressure on that species.*” In this way, the increased popularity of Mulloway, capitalised on by fishing magazines and tackle companies, has the potential to inflame conflict through promoting the catching of Mulloway and in turn increasing the scarcity of the resource. Alex, a Fisheries Manager also echoes this idea that scarcity is increasing the attractiveness of Mulloway; “*they were always just a bit special and they are even more special now because there are hardly any of them left.*”



**Fishing World**

October 4, 2017 · 🌐

...

This image shows a haul of dead mulloway netted in an estuary not far from Sydney. With only 5% of NSW mulloway biomass remaining, Fisheries Minister **Niall Blair MLC** needs to act NOW to save this iconic species. The fact is 75% of the 80 tonnes of mulloway caught in NSW by commercial netters are under the legal length of 70cms. Minister Blair, this must stop! The netters MUST adhere to the same size limits as recreational fishers. They can't continue destroying our mulloway stocks by slaughtering undersized fish!

Contact the Minister now!

Follow this link: <http://bit.ly/2q0aTX0>

Or call the Minister's office on (02) 8574 7190

Make your voice heard!

**FIGURE 7:** FISHING WORLD FACEBOOK POST. OCTOBER 4, 2017

Similarly, the marketing of Mulloway, and its increased popularity, draws increased numbers of people into the discussion around Mulloway. This will often see greater diversity among stakeholders in relation to; sex, age, worldview. This diversity often sees a variety in opinions. Though this diversity is crucial in increasing decision quality (Curseu et al. 2017), it also subsequently contributes to the increasing complexity in mitigation and resolution of environmental conflicts.

It can also be uncovered is the presence of an economic imperative for recreational fishers to shift 'blame' to commercial fishing. With the objective of securing a greater resource share, through reducing commercial fishing, there is a potential greater economic return for the recreational fishing sector as a whole. This including greater economic return also including fishing magazines and tackle companies.

### **5.3 ENVIRONMENTAL KNOWLEDGE**

In allocating blame, environmental knowledge is employed in different ways by different actors. For recreational fishers and fisheries managers and scientist's arguments relating to the lifecycle of Mulloway as a species are employed to position blame on commercial fishers. Narratives of how commercial fishery operations intersect with two points in the Mulloway lifecycle are central to these arguments.

The first narrative is around the interaction between prawn trawlers' nets and juvenile Mulloway (soapies). Juvenile Mulloway can be bycatch (incidental capture of non-target species) from prawn trawling within estuaries. As understood by Todd, a fisheries manager and scientist, these soapies "*are a fragile species,*" subsequently are vulnerable to injury. Commercial trawling nets targeting other prawns are then understood to cause sizeable mortality to "*fragile*" soapies as bycatch. Todd continued; "*from the commercial sector, to me, there are 2 big problems. The first; By-catch. When Mulloway get rumbled around in that net, even for a short time they are not going to survive.*" Gerald, a fisheries manager and scientist, holds this same understanding; "*you know there are nets up there killing millions of baby Mulloway.*" Gerald turns to the language of 'baby Mulloway' rather than scientific terminology. In doing so, the use of the metaphor 'killing babies' energises a moral intuitive. The indiscriminate qualities of trawling nets of commercial trawlers are thus understood by fishery managers as not only key for the decline in reported Mulloway numbers, but also morally wrong.

Similarly, Andrew, a recreational fisher, employs the metaphor of 'baby' to discuss how juvenile Mulloway are caught in commercial prawn fishers' trawl nets: "*a lot of baby Jews get killed in the trawler nets.*" Andrew continues that:

*I don't want to see them all lose their jobs but of it is going to stop fish stocks getting absolutely smashed then there must be something that can be done? I know a lot of commercial fisherman, we are good mates but if they are killing 1000 baby Jew a month it just isn't good.*

Here, Andrew understands the future of "*baby Jew*" and the reduction in their mortality to be more important to secure than the jobs of friends. Andrew understands killing baby Jew as morally wrong. Yet he does not wish commercial prawn trawlers to become unemployed. To resolve this dilemma he asks the question, 'there must be something that can be done?'

Yet, at present there are no proposed stages to develop and apply modification in prawn-trawl fisheries. One starting point would be the quantification of bycatches to support claims that the nets of prawn trawlers kill millions of Mulloway. As Gerald, a fisheries manager and scientist noted when discussing recreational fishers; "*they [recreational fishers] are assuming that when they see a trawler at the front of Hawkesbury that they nets are just full of dead Mulloway.*" Max, a recreational fisher,

confirms the power of the narrative that prawn trawlers' nets are killing juvenile Mulloway;

*I've heard that lots of soapies get killed by the prawn trawler nets, and that's just no good."* Max continued, *"recreational fisherman don't take a huge number, I mean I release 85% of the fish I catch, I get sick of eating them.*

As such, Max understands that his effect upon Mulloway stocks is far less a threat than the perceived mortality caused by "baby" Mulloway's interaction with commercial prawn fishers and their trawling nets. Even though Max's belief surrounding the mortality of "baby" Mulloway was not informed by scientific reports, or firsthand observation but by narratives about prawn trawlers' nets; *"I've heard"*. Max, like many recreational fishers and fishery managers tap into the moral intuitions that killing babies is wrong to appropriate blame to commercial prawn trawlers.

A second narrative amongst scientists appropriates blame to estuary general commercial fishers, a method of commercial fishing whereby Mulloway is one of several target species. In this narrative, scientists argue that fisheries regulations are creating a financial incentive to target Mulloway. As of July 2018, when interviews for this project were completed commercial fishers could retain 10 Mulloway on their boat between the lengths of 45-70cm (this regulation has now changed, see footnotes). This was intended to allow commercial fishers to retain Mulloway caught as by catch when targeting other species, rather than having to return them to the water. At this size and age, Mulloway is edible, therefore attractive to catch for sale, but is has not yet reached sexual maturity where they can breed (DPI, 2013). Todd, a fisheries manager and scientist explains;

*A decision which was not the right decision going back a few years... they brought in a new regulation for Mulloway that was the 70cm size limit and then the Estuary and General commercial fishers... were getting these smaller Mulloway in their nets, (45-70cm) and under the law they had to throw them away, and they made the case that this was not good, because the fish were dead anyway and why throw them away why not let people eat them? And so the government agreed to that and they were allowed to keep 10 a day... The estuary and general catch I think is particularly devastating... so now the concern is that these Gill net fishermen are actually targeting the Mulloway.*

Todd's narrative highlights how regulation can play a crucial role in managing, or in this case, exacerbating conflict. Whilst fisheries regulation is often built on scientific understandings of the species, responses to regulation are driven by the social and economic imperatives that drive human behaviour, which can be unpredictable and result in perverse outcomes. For Todd, changes to the legislation rather than preventing the discarding of bycatch as waste, will result in certain commercial fishers targeting Mulloway. Todd predicts a 'devastating' outcome for Mulloway. Similarly Fitzpatrick et al (2017) outlines that perverse outcomes in fisheries can occur as a result of inadequate consideration of human dimensions

Ian, a commercial fisherman, also highlights how regulation can drive or exacerbate conflict, again highlighting that the success of regulation is intimately tied to the social and economic context in which it operates. Ian illustrates how the discarding of bycatch helped reaffirm understandings amongst some recreational fishers of commercial fishers as pillaging the ocean. In his words;

*If we are out there and we are pulling our nets in and we are getting a really nice Jewfish this size (gestures to 60ish cm) and its dead and then we have to throw it back and there is a recreational fisherman watching us that is where you get conflict. But that isn't our fault it was what we were told to do. (Ian)*

Ian understands that the previous regulations surrounding his interaction with dead undersized Mulloway may heighten conflict with recreational fishers. Dead Mulloway sized 45-70 cm landed in nets then discarded through regulatory requirements is positioned as wrong. Ian he explains, this is not his choice, but "*what we were told to do.*" Therefore, Ian argues, that the requirements of regulation reaffirm perceptions of commercial fishers as to blame for problems in the fishery. .

Recreational fishers were seen to position themselves as sustainable, environmentally conscious individuals. This was largely understood due to their practice of fishing techniques that are understood to reduce harm to the fish after capture. Catch and release is one technique understood by Tim, a recreational fisher, to be an environmentally conscious choice that himself and the perceived majority of recreational fishers to be participating in. In his words;

*"Good thing is that a large portion of the recreational sector is very pro catch and release" (Tim)*

Max again similarly understands this:

*“On the conservation sides of things we do push fishing techniques that don’t harm the fish... lip grips to hold the fish correctly, things to keep their slime and their scales intact. So that is a good thing... there is a lot that goes into the safe release of the fish” (Max)*

Max positions recreational fishers again to be environmentally conscious focussed on the “*conservation sides of things.*” Furthermore Max understands that this practise in safe release is not a simple practise where: “*there is a lot that goes into the safe release of the fish*” As such, Max understands himself, and others in his industry to be going above what is socially expected of them, confirming his belief of a sustainable recreational fishing industry. As such, this understanding sees recreational fishers separate themselves from Mulloway’s decline, for if they are environmentally conscious how could they be contributing to the decline? Max’s understanding of catches and release practises of recreational fishers corresponds with DPI’s 2016 Mulloway recovery report, where 81% of recreational Mulloway catch was estimated to be released from 2013-2014. Though looking back at 2000-2001 data only 28% of recreational Mulloway catch was released as such, Max’s understanding that recreational fishers are releasing the majority of Mulloway caught only holds true in the present day. In that same time period (2013-2014) commercial landings were at approximately 60 tonnes. Recreational landings of Mulloway were estimated to be at 102 tonnes, though as stated previously 81% of these landings was estimated to be released. Though still, the catches from both commercial and recreational fishers are comparable.

As such, it becomes apparent that evidence is used strategically in instances of environmental conflict to support particular positions. In this case evidence is used to separate recreational fishers from the cause of Mulloway decline and consequently sees the appropriation of blame placed upon the commercial fishers.

### 5.3.1 EXTERNAL ENVIRONMENTAL ISSUES

External from the perceived threat of fishing pressures’ upon Mulloway stocks, it is understood by all parties, that there are other environmental issues that are understood to be contributing to Mulloway stock decline. For some, these environmental issues



understood to be the sole threat to Mulloway stocks. Jim, a commercial prawn trawler understands that water pollution caused by population growth in the Sydney Basin and recreational fishers to be a larger threat to Mulloway stocks than the perceived threat of him trawling in the Hawkesbury River. In his words;

*“If you want to worry about something worry about how many hooks are going in the guts of fish, how many lead sinkers are going in the guts of fish and in the river, You should be worried about the 4 million people coming into Sydney that want to shit in the river [Hawkesbury River]. Think about the urban runoff from all those people that is the big worry.”*

Here, Jim understands the ‘worry’ and hype surrounding Mulloway stock decline to be a trivial notion, comprehending that individuals “*want to worry*” about an issue regardless of the issue even being present. This consolidating his previously highlighted view that there is in fact no issue with Mulloway stocks themselves. Rather than continuing his idea surrounding the trivialities of worry, Jim moves to point out that the two recreational fishing tools; ‘*hooks*’ and ‘*lead sinker*’ are worth worrying about if you must worry. Jim understands that these; ‘*hooks*’ and ‘*lead sinker*,’ cause mortality within fish, and chemical pollution within the Hawkesbury River. As such Jim’s understanding sees the appropriation of blame placed upon recreational fishers for Mulloway stocks decline, if the decline is actually real. Accordingly the urban runoff produced by “*the 4 million people coming into Sydney that want to shit in the river*” is understood by Jim to also be degrading the water quality in the Hawkesbury River. As such, Jim draws attention to the role that a much wider set of actors (the population of Sydney) play in the environmental degradation of Mulloway’s habitat.

Concerns over broader environmental threats are shared amongst fisheries managers and scientists, as noted by Sam;

*“I know it [Mulloway stocks] is not responding in the same way that other fish responded to, like gemfish, all the others we have tried to manage has shown signs of recovery and yet the reduction in the fishing effort on Mulloway is far more proportionately draconian than virtually any other fish...I do know that recruitment is being threatened due to the collapse of their habitats.”*

Sam understands that Mulloway management, in the form of fishing effort reduction, should have seen the recovery of Mulloway stocks. Sam points to the example of the

gemfish fishery, where similar management responses resulted in stock improvements. Given the more ‘draconian’ management responses to stock declines in Mulloway, Sam understands that there must be other factors that are impeding Mulloway’s recovery outside of catch rates, such as problems with recruitment caused by the collapse of Mulloway’s habitat. Recruitment refers to the number of surviving new individuals entering the population (DPI, 2018). Despite this, Sam does not believe that habitat degradation alone is the cause of Mulloway stock decline. In his words;

*“There is are two separate issues you need to regard 1) Who fished it down and 2) Who destroyed the habitat and if the habitat has been destroyed then does the same amount of fishing cause more of a problem then if the habitats were in good condition.”*

Rather, Sam understands it to be a combination of two factors: 1) Fishing pressure, and 2) Habitat destruction. Thus, Sam’s explanation of the causal factors of Mulloway stock decline reveals the need for management to think outside of fishing pressure alone as Mulloway is “is not responding” to the “draconian” management on fishing pressure.

Environmental concern is again voice by Walter, recreational fisher. In his words;

*“I mean sure, the River [Hawkesbury River] is nowhere near as clean as it once was, like all that rubbish you see in there now, that can’t be any good, it’s probably hurting the fish [Mulloway]”*

Walter again understands, somewhat apprehensively, that the habitat of Mulloway within the Hawkesbury River; “the river,” is under threat. Here Walter believes that pollution in the form of rubbish is contributing to the decline in Mulloway stocks.

Recreational fishers, commercial fishers and fisheries managers and scientists hold common ground over their understanding of environmental threats outside of fishing pressure. This understanding is widely documented in the literature; where water quality is known to affect the health of fish populations and other species within rivers (Haworth et al. 2000; Davies et al 2000; Simmons et al. 2016). Though these external environmental factors were acknowledged they tended to be overlooked. The previously described drivers causing the two ‘sides’ see discussions centring on blame. This acts to further divide recreational and commercial fishers rather than a combined effort to highlight broader environmental concerns.

## 5.4 SOCIAL RELATIONS

### 5.4.1 RECREATIONAL FISHING MASCULINITIES; WHY IS MULLOWAY SUCH AN IMPORTANT STATUS SYMBOL?

Alongside the economic configuration of the environment, a political ecology framework pays consideration to the social and cultural norms, specifically the gendered dimensions of how people interact with the environment. Gender plays out within the recreational fishing community in terms of how this leisure practice is deeply entwined with rural masculinities in Australia and a gendered division of leisure pursuits. In this section, the meanings and experiences of the men who catch Mulloway as leisure practice in the Hawkesbury offers insights to the normative practices of gendered performance. The section documents the gendered ‘social capital’ of targeting larger fish within the recreational fishing community in Australia and begins by outlining how recreational fishers are embedded with capitalist modes and relations of production and how these inflame conflict.

The meaning of leisure time is often understood as offering opportunities to recover from working lives, which enables people to become more productive at work. As expressed by Phil:

*“When you are working, you are paying your taxes, you are doing all that, you are bringing up your family, you’re paying your bills, you are complying with your Rego, you jump through hoop after hoop after hoop and you finally get to the weekend, and it feels like you took away the only thing that I sort of care about, and that makes me really annoyed.”*

Through leisure activities an individual can ‘recharge’ themselves again upon the oncoming of their working week, and the same can be said for recreational fishing. For Phil fishing for Mulloway, becomes understood as a necessity to relax. Hence, for Phil his, fishing provides the antithesis experience of his working life. Without access to recreational fishing, Phil conveys his anger. This anger is directed towards those who have robbed him of his momentary escape from the rhythms of working life. In Phil’s example he identifies commercial fishers to be those who have “*taken away*” this escape. Thus, the appropriation of blame is placed upon commercial fishers for Mulloway’s decline and the reduction in Phil’s leisure time.

Recreational fishers' relationships with Mulloway are highly gendered. Within the Australian recreational fishing community Mulloway is a prized species (Kailola et al. 1993), and as such is highly targeted. This meaning was confirmed by participants. Men who fish for pleasure spoke about the Mulloway as a "*big...mythical beast... prestigious type of fish*" (Tim), "*mysterious and allusive...big*" (Max), "*big and beautiful*" (Andrew) "*big and impressive fish*" (Will). The use of "big" was consistent across recreational fishers, underlining the importance placed upon size of the Mulloway when understanding why the species is so prized. Yet, importantly, the meaning ascribed to the Mulloway as a cherished fish is attributed not only to its size but also its scarcity (*mythical beast*). Hence, for many men who fish for pleasure the Mulloway is understood as a status symbol. For example, Tim spoke of the Mulloway as a "*prestigious type of fish*", and again by Will as a "*big and impressive fish.*" It may be asked; impressive and prestigious for whom? Tim may help answer this question when he continues that:

*"just want the photo to get that thing on Facebook to get the likes and the comments ... So, I think that is why there is an increase in the popularity (of Mulloway). That one metre Jewwy everyone wants to brag now and go - Look what I caught, I'm the best* (Tim)

Here, Tim understands that for recreational fishers the importance of Mulloway does not alone lie in the fishing for the fish itself, but also in the gendered social capital that may come by catching and displaying this fish on social media. Tim understands that through catching a large Mulloway an individual can "*brag*" and self-proclaim themselves as the "*best*". In doing so, the associated gendered social capital is accrued to those who catch a large Mulloway. When fishers brag around catch-size they are demonstrating the social norms of fishing masculinity that align the "*best*" fishers with landing larger, heavier fish.

The posting of a photo upon social media may be understood in terms of Butler's (1988) ideas of performativity. Rather the gender being configured by biology alone, Butler points to how gender norms rely upon the ongoing repetition of particular social norms that help stabilise gendered bodies. Butler (1988) conveys masculinities and femininities to be created through "sustained social performances," whereby performing an individual's gender wrong comes with penalties and performing it well comes with acceptance and reassurances (Butler 1988). Thus, these gendered performativities are

continuous and constituted by an individual's context. As such, the posting of large Mulloway catch photos upon social media can be understood through the notion of performativity, where an individual's masculinity within recreational fishing circles can be articulated and confirmed. The aspirational qualities for some men surrounding fishing for Mulloway are evident in Phil's words; *"I haven't caught that really big one yet, the one everyone talks about, and that's why I keep going back"* (Phil). How recreational fishing masculinities are aligned to catching specific species like Mulloway helps explain the ongoing drive to catch a particular size of fish. In this view, what are also revealed are the social norms around masculinity within recreational fishing for Mulloway that encourage some men to purchase specific equipment to catch Mulloway for leisure.

One way the social normativity and hierarchy of fishing masculinity is produced and circulated is through marketing of fishing. For example, the rod and reel are marketed by fishing magazine and tackle producers in a way that reproduces the notion that catching a bigger fish makes you a more worthy male figure. For instance, the "New Shimano Stella 8000 SWB Spin Fishing Reel" seen upon Fishing Tackle Shop, a popular Australian tackle distributor, is marketed as the reel that: *"Helps to manhandle big hard fighting fish, giving you the lifting power when you need it."* Likewise, the marketing behind the tackle company Savage Gear positions their new rod as; Savage Multi-Purpose Predator2. In reference to the Oxford English Dictionary (2010), predator is defined as *"an animal that naturally preys on others."* Predations create a hierarchy within the food chain. As such, Savage Gear's "Savage Multi-Purpose Predator2" plays upon social norms that suggest the normativity of the recreational fisher who owns this gear may also be atop the hierarchy. Both product-marketing lines draw on dominant social norms that suggest the normativity of recreational fishing masculinity is to have power over the fish. As such, social norms of manhandling and predating present in the fishing marketing industry act to promote masculinities underpinned by gendered ideas of the recreational fisherman separate from, and with control and authority over fish within recreational fishing.

Subsequently these masculinities, present within recreational fishing, act to heighten the aggression and conflict when it comes to inability to catch Mulloway or potential restrictions. In this way inability to catch Mulloway can be understood to constrain an individual's access to their sense of self (Mulloway) and their expression of

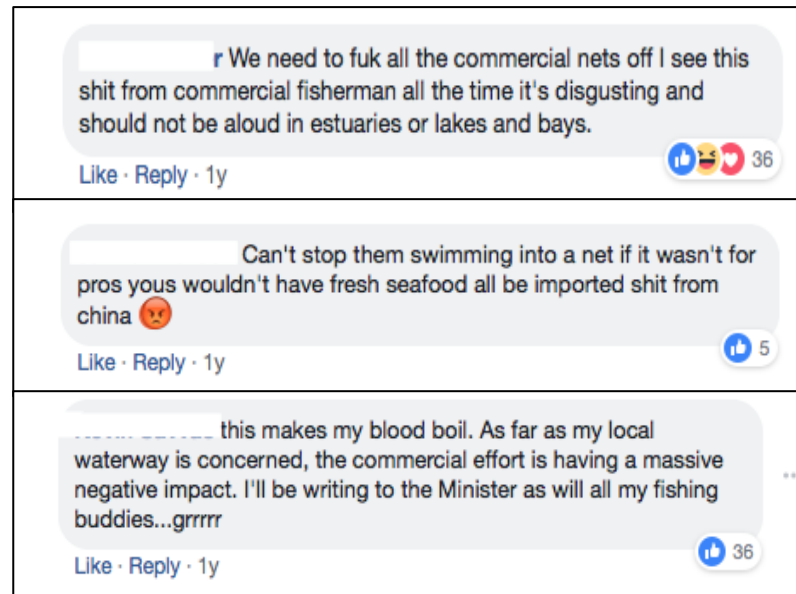
masculinities. The appropriation of blame onto another party is one way of protecting one's sense of self. As such there is potential that the masculinities present within fishing are acting to inflame the conflict between commercial and recreational fishers and influence where blame is placed.

## **5.5 SOCIAL MEDIA AS THE PROBLEM–SUSTAINING AND GENERATING DIFFERENCE**

Social media platforms allow for the circulation of knowledge between billions of people around the world. Knowledge may be quickly produced and exchanged constrained only by internet connectivity (Pi et al. 2013). As such, individuals with similar interests have formed 'private groups' online where an individual must be approved by the other group members, to gain access and interact upon the group's page. Many of these online groups exist for both the recreational and commercial fishing sectors. Examples of these include; "Mulloway Fishing Australia," and "Commercial fisherman of Australia". The knowledge circulated on these pages affirms an individual's sense of belonging to a social group through sharing of often private details. In Tim's words, a recreational fisher, knowledge sharing upon social media platforms has seen the following;

*"Whereas today I think that social media and the way we all interact, talk on messenger and have friends on different states, the information is a lot more freely passed so if there is someone in Newcastle and you live in Wollongong you aren't too afraid to tell them some of your secrets because they aren't about to come to Wollongong and try and fish your spot. They will do it in their own backyard." (Tim)*

As a platform to configure collective identities, these pages contain heated online exchanges to help differentiate what it means to be commercial and recreational fishers.



**FIGURE 8:** COMMENTS FOUND UPON FROM FISHING WORLD FACEBOOK PAGE

Hence, social media platforms are key to understanding the circulation of knowledge of commercial fishers, recreational fishers, fisheries managers and scientists. Social media platforms are pivotal as mechanisms to voice concerns and mobilise support in the public realm. Hence, social media platforms are integral to understanding the problem. Indeed, some commercial fishers express that the knowledge circulated through social media platforms is integral to understanding how environmental conflict is produced, sustained and heightened. For instance, Ian, a commercial fisher positions blame squarely at social media platforms;

*“It is social media, social media has brought us big time trouble because there are always photos. When this 10 fish (regulation) came in before that we could keep as many as we wanted over 45cm. somebody put a photo on Facebook of a mesh net down in the Shoalhaven of a boat, in the guy’s yard on his trailer just full of smaller sized Jewfish and the recreational(s) went nuts on it. Social media has brought us undone big time. And once that happened the people that sat on the recreational board posted saying that the recs should “Get on social media, write to your local member to get these guys banned”. But, it was an old photo taken 10 years ago, the regulations were different then. Probably just posted it because he looked good, but then it was shared elsewhere.” (Ian)*

Foucault’s (1985) concept of surveillance is helpful to better understand the power of knowledge circulated within the social media platform. Following Foucault, knowledge

operates as a form of power, as it creates particular subjectivities through self-governance. In this case, the photographs were used by a recreational fisher to constitute commercial fishers as ‘plunderers’ of the ocean. Commercial fishermen were portrayed as not governing their behaviour in ways outlined by the state fishing regulations. Consequently, commercial fishers were portrayed as unruly and must be controlled.

According to Ian, the photo showing a commercial fisher and a boat full of “undersized” Mulloway was taken many years before the regulations restricting Mulloway catch. As of 2013 new regulations on Mulloway size saw the legal minimum length be 70cm, with a by-catch allowance of 10 fish between 45-70cm (DPI, 2013). The fish pictured were under this size, though importantly, according to Ian the photo was taken 10 years ago when the minimum legal length was 45cm.

In politics of blame, the photograph of undersized fish regardless of when it was taken was employed to mobilise recreational fishers through sharing on social media platforms. Ian recalls how this photo “*brought us big time trouble*” as the “*Recreational went nuts on it*.” The photograph was employed as a call to arms amongst recreational fishers against commercial fishers that were apparently not self-regulating. Hence, given commercial fishers had illustrated they could not be rendered governable, recreational fishers advocated “to [write] your local member to get these guys banned”.

Ian’s story illustrates another level of complexity in regards to the rules and regulations governing the pictures posted on social media platforms. Social media platforms themselves are underpinned by a capitalist imperative. They operate under a specific logic of capitalist accumulation that trades on extraction and commodification of big data. Social media platforms place minimal restrictions on privacy and sharing of inflammatory or inaccurate material (Lee et al. 2015). Hence, misunderstandings, assumptions and malicious practices can subsequently occur through the posting of photographs or stories with little consequences of those undertaking such practices. In this way there is plenty of opportunity upon social media for stories to be contested and ill-informed views to be voiced.

Ian explains that social media platforms are not suited to opening dialogue to resolve blame. Instead, social media platforms are suited to heightening divisions between social groups. Ian continues;



*I just wish that the commercial and recreational fishers could come together and be one. But they never will be, it's just too much, if someone puts a post on Facebook of a commercial fisherman the recs will straight away start posting Ban them! Get them out!*

Social media platforms open-up dialogues that appear to encourage conflict, that draw on sets of ideas that point to difference between commercial and recreational fishers. As Tim, a recreational fisher, tells:

*So you see someone will post a photo and 100 people will say congratulations and then a commercial fisher will come along and say something and then it becomes an all in war.*

Both Tim and Ian understand the conflict and backlash between commercial and recreational fishers online to be at times unprovoked and unwarranted. Ian and Tim position social media platforms where specific sets of ideas contained in a post may trigger “war” “straight away”. Social media platforms become a tool where oppositional difference of ‘us’ against ‘them’ may be sustained through the use of particular photographs and words.

The concept of group mentality may also assist in driving the conflict between ‘us’ and ‘them’ often seen on social media. According to this theory, when individuals become part of social group they forfeit a part of their individuality. This is known as ‘deindividuation,’ that is individuals to achieve a sense of belonging are more likely to adopt the ideas of those in the crowd (Hinshelwood et al. 2003)

In this case, the ‘us’ of recreational fishers is positioned as environmentally responsible; unlike the portrayal of the ‘them’ of commercial fishers as untrustworthy. Alex, a Fisheries Manager, explains how this generates ‘sides’, both which claim they have rights to fish for Mulloway:

*“Both groups would consider their own need and their own interest in Mulloway to be greater than the other group. No matter which side you are on, you are going to think that your side is the more important sector in this debate. It is this idea that it is a god given right for each sector to take the Mulloway.”*

This phenomenon is not separate from social media, it can be conceived that in fact that knowledge sharing upon social media produces and reproduces understandings of recreational and commercial fishers and their practices that sustains difference and the

group mentality. The group social media platforms operate as a mode through which knowledge that affirms the identity of the group can be voiced. Thus, the type of knowledge circulated on social media platforms maintains and heightens the conflict between commercial and recreational fishers, through sustaining difference and allocating blame on a specific group.

## 5.6 US/THEM: COMMERCIAL FISHERS AS “RAPERS AND PILAGERS”

Throughout the course of the interviews it became evident that the conflict between commercial and recreational fishers does not alone stem from Mulloway itself but is embedded in sets of ideas that position commercial fishing practices as form of environmental rape and commercial fishers as not trustworthy.

Commercial fishers are positioned as others by recreational fishers. In Tim’s words, a recreational fisher;

*“it is a historical stem of the recreational and the commercial guys have always had a general dislike for each other. Probably in some areas a “hatred” for a harsher word. I mean I was probably brought up in that mindset of the Shoalhaven area that we hated the Pros [Commercial] I mean you would go out to fish and you would try really hard to catch your Jewwie and enjoy it and then that guys will come along with a net out. It just seemed like they were raping the estuary.”*

Tim conveys how recreational fishing culture sustains a socially constructed binary of us/them, which generates and maintains a hate between the two social groups. The ‘us’ of the recreational fishers as skilled and environmentally responsible exists in relationship to the ‘them’ of the ‘pros’ who are narrated as unskilled and irresponsible. Tim underscores how this legacy of his childhood continues to inform his understanding and dislike of commercial fishers and their practices. Again voiced by Will, a commercial fisher; *“Everybody hates everybody. That’s fishing.”* This othering is integral to the experience of commercial fishers. Hence, Jim, a commercial fisherman understands that he, and others in his industry are viewed by recreational fishers as immoral individuals. In his words: *“We aren’t looked at as food providers we are looked at as rapers and pillagers. That is the problem. When is the State government going to do something about it?”* A legacy of commercial fishing culture, the name raper obscures more nuanced understandings of the practices and politics of

fishing. Jim understands himself to be a food provider, providing seafood to the public in the same way a farmer provides produce to those who do not farm themselves. As Ian, a commercial fisher, points out this name of raper only further marginalises commercial fishers: *“We are a small minority group. To a politician we [commercial fishers] are nothing.”* The binary between recreational and commercial fishers is necessary to understand the environmental and geopolitical decisions in favour of recreational fishers and farmers. For example, in times drought the NSW Government is seen to roll out “Emergency Drought Relief Packages.” As of 30<sup>th</sup> of July the NSW Government announced 1.1 Billion dollars to aid those families struggling through drought (DPI, 2018), a generous contribution to those providing the State with food. It becomes evident at the commercial fishing industry is not understood, by parts of society, to be welcome under the same umbrella of social acceptance that NSW farmers and recreational fishers sit under.

That said, some fisheries managers and scientists question the labels ascribed by other fisheries managers or scientists and recreational fishers. For example, Todd, a fisheries manager and scientist questioned the categories that recreational fishers use to appropriate blame upon commercial fishers for the decline fish numbers. In Todd’s word:

*“I get a little concerned with recreationalists that say: “Oh it is all the commercials fault” there are more of us then them- that is a narrow way of looking at it, because what anglers [recreational fisher’s] forget is that so many people in society who enjoy eating fish don’t fish themselves, the only way they can get those fish is if the commercial guys catch them some fish and sell them to the shop. That is a valid use of the resource.”*

Todd is aware of how recreational fishers deploy certain knowledge to disempower commercial fishers. Todd advocates for the label of commercial fishers as food providers. Similarly, Sam a fisheries manager and scientist advocates for commercial fishers as sustainable food providers:

*“My issue is, that in principal, the provision of fish as a source of food has my immense support as something we must do! There is no other more sustainable source of food then that, but individuals in the fishing [commercial fishers] community are pretty difficult to get behind because they won’t help themselves...You could be quite*

*forgiven in believing that they are doing the wrong thing because they [commercial fishers] don't present themselves in such a way as to be a credible group of information... They [commercial fishers] get up in public and one smart arse [fisheries manager and scientist] says 'you don't understand this, Mulloway doesn't grow that fast' and then the poor guys just don't say anything... I don't know how many meetings I have been to when someone I have had to call into line where they will shut down fisherman [commercial fishers] 'you're not a scientist and I know because I am a scientist' ... and they get that all the time"*

Sam is aware that fish consumption/production, on average, produces less greenhouse gas emissions when compared to beef, pork or lamb production (Parker et al. 2018). Yet, Sam goes on to draw upon another social constructed binary that views scientists to possess credible information, and for commercial fishers to possess non-credible information. Sam understands that within “meetings” scientists’ position themselves as the authoritative knowledge where other knowledges, per se commercial fishers knowledges, are simply disregarded for not being scientific; *‘you’re not a scientist and I know because I am a scientist.’* Tim understands that commercial fishers are often told that they “*don’t understand this*” which subsequently leads to the further discrediting and silencing of commercial fishers voices within the management realm. Ironically, meetings and conferences are often arranged to enable sharing of many knowledges, though here Sam understands that this is not the case. Sam continued;

*“Get the public to realise that you [commercial fisher] are a very desirable part of the community. Not some rapers and pillagers who are out there destroying the environment, which are what the current marine biology scientists in Australia are telling everybody... there is no NSW fishing industry there is a whole group of desperate individuals”*

Sam again speaks to the socially constructed binary that sees commercial fishers viewed as an undesirable part of society.

As such, it is revealed that the legacy of scientific understandings joins with that of recreational fishers to reinforce the dichotomy of us/them that acts to disempowers commercial fishers.

## 5.7 CONCLUSION

This chapter unpacked the social and knowledge hierarchies that privilege fishery managers and recreational fishers over commercial fishers. Fishery managers and scientists are positioned as holding the authoritative knowledge based on conservation biology. Recreational fishers position themselves as environmentally responsible as a group. In contrast, commercial fishers' knowledge was discredited and as a group they were 'othered' by recreational fishers and fishery managers as untrustworthy and ocean and river rapists. Social media platforms, and fishing magazines acted to generate knowledges and sustain conflict between commercial and recreational fishers. Environmental pressures and threats, external to fishing, was a point of agreement by all groups. Though, this was often overlooked while the focus remained on the differences between the various social groups.



## CHAPTER 6: CONCLUSION



## 6.1 INTRODUCTION

To conclude the final chapter is structured in three sections. The first returns to the thesis aim and research questions. An overview is provided of how the aims have been addressed by offering a summary of each chapter. The second section addresses future research agendas. Two possible research agendas are discussed. A call is made for conceptual thinking that acknowledges the agency of fish, alongside one that underscores the importance of the commercial fishing industry engaging in a research partnership.

## 6.2 REVISITING THE RESEARCH AIMS AND QUESTIONS

Chapter 1 outlined the research significance, aims and questions. Research significance for this project arises out of the contested claims over who should be fishing for Mulloway in the coastal and estuarine waters of New South Wales. This conflict is heightened within the Hawkesbury River, where commercial and recreational fishers are seen in large numbers, and where ongoing negotiations to reduce their allowable catch due to statistical evidence of reduced stock numbers continues. In this context, the thesis aim was to better understand the conflicted knowledge surrounding Mulloway in NSW. The research was underpinned by two key research questions; “Is there a problem? And, second: “Who is to blame?”

Chapter 2 situates these research aims and questions within a wider literature on how both biological science and social sciences bring beneficial insights to help better understand conflict over fisheries resource management. Political ecology is introduced as one possible conceptual lens to help understand that resource management conflict as embedded simultaneously in economic, cultural and environmental relationships. Conflict is understood to be always spatially situated within the capitalist market, notions of gender, class, ethnicity and sexuality, as well as knowledge of the fish and fishing places.

Chapter 3 outlines a method that aligns with the conceptual thinking of political



ecology and draws attention to the market conditions in which fish are caught, ideas about social categories and understandings of fish and environmental factors. Hence, this project combined semi-structured interviews with 'go-alongs'. The former was designed to facilitate participants to tell fishing life narratives to reveal insights of Mulloway, the conflict that surrounds the fish and why, how and where they fish. The latter was incorporated to help participants share their situated fishing knowledge, and for the researcher to gain deeper understandings through shared experiences and being shown how to fish. However, some participants were reluctant to participate in go-alongs, because of their time intensive quality, health and safety concerns of small fishing vessel and the lack of scientific fieldwork occurring during the research time frame. Recruitment involved an outreach via email, fishing forums, face-to-face, Facebook and Instagram. A total of fifteen participants gave their consent to participate, five individuals from each of the three key stakeholder groups; commercial fisher, recreational fishers and fisheries managers/scientists.

Chapter 4 addressed the first research question of this thesis by asking the question: "Is there a problem?" To answer this question the chapter offers an analysis of how conflict emerges at the intersection between economic relations, knowledge of Mulloway and gender. This chapter revealed a wide array of knowledges between participants in relation to both Mulloway itself, and the perception of Mulloway stock numbers. Recreational fishers, fisheries managers and scientists understood Mulloway stocks to have declined, while commercial fishers disagreed. Drawing on political ecology, one explanation for the disagreement between commercial and recreational fishers is the different capitalist conditions under which Mulloway was caught. Commercial fishers' boats, nets and fishing practices are designed and understood to maximise economic efficiency. Due to this productivity, commercial fishers can continue to catch reasonable amounts of fish. This confirms previous research that understands fisheries to continue even when fish populations have reduced beyond the limits imposed through the concept of Maximum Sustainable Yield (MSY). In contrast, recreational fishing while still embedded in modes and relations of capitalism, which relies upon selling the experiential dimensions of catching the fish rather than the fish itself. Recreational fishers, individually, catch much smaller numbers of fish than commercial fishers but invest heavily in the experience of catching those fish. This lower level of 'efficiency' requires a larger

population of fish with rod and reel technology to enable this commodified experience. This may result in recreational fishers being more sensitive to stock declines and therefore more likely to accept the proposition that there is a problem in the fishery.

Chapter 5 addressed the question: “Who is to blame?” This chapter unpacked the social and knowledge hierarchies that privilege fishery managers and recreational fishers over commercial fishers. Fishery managers and scientists are positioned as holding the authoritative knowledge based in conservation biology. Recreational fishers position themselves as environmentally responsible through advocating for practices like catch-and-release. Fishing magazines circulated knowledge about how to fish for Mulloway. As such, they were also seen to be a mechanism that pushed fishing trends among recreational fishers. In contrast, commercial fishers’ knowledge was discredited and as a group they were ‘othered’ by recreational fishers and fishery managers as untrustworthy and ocean rapists. Recreational fishers told of how these ideas were embedded in their fishing culture, to help sustain their own respectability. The circulation of these sets of ideas by recreational fishers on social media platforms acted to generate and sustain conflict with commercial fishers positioned as other. Arguments relating to how commercial fishery operations intersect with two points in the Mulloway lifecycle become crucial to appropriate the blame in the reported decline of Mulloway numbers and label commercial fishers as ‘baby killers.’ These same arguments tended to overlook or diminish the potential environmental impacts associated with the cumulative impacts of large numbers of recreational fishers fishing for Mulloway. Sustaining these differences between the various social groups tends to help overlook the point of agreement, that contributing to Mulloway stock decline involves habitat degradation and water pollution.

### 6.3 FUTURE RESEARCH

Two future research agendas are offered. One future research focus could be centered specifically on further understanding the knowledges of commercial fishers to give agency to their voices. At present, inviting individuals to forums and voicing their opinions on fishing issues is futile given the entrenched opinions not only about fish numbers but also the attributes of commercial fishers. Throughout this thesis, it became evident that commercial fishers, within NSW, were often positioned as an un-credible, immoral, outsider. This point was underscored by one participant Sam, a fisheries manager and scientist:

*They [Commercial fishers] have to take on every bit of the rhetoric that gets thrown at them as being the cause of the problem... and as such it must be science driven, analytically driven by evidence-based science and it must be critically questioned. And I even said I would be a part of it and work for half the cost because I believe so strongly in the social implications of this issue...you have to deal with every single point of the criticism when it comes out.*

A research partnership between the industry and a university is one way to address the conflict generated by current social prejudices that position commercial fishers un-credible and immoral. Future research into why the social prejudices with fishing communities exist and how they are maintained is helpful to manage conflict. Clarification is required around bycatch alongside dispelling myths of fishers as ocean rapists. Further empirical data surrounding by-catch numbers and indeed quantifying the effect of commercial nets on Mulloway ‘soapies’ should be undertaken. Such a research agenda combines the approach of scientists alongside that of critical social scientists. Outcomes of this research would then need to become the basis of public and stakeholder engagement and education. Mediation could also play a key role in this, allowing those involved within Mulloway conflict to explore options that may act to reconcile the conflict. As such. This approach could see the sharing, diverging and reflecting upon different meanings and experiences of catching Mulloway and subsequently become an integral part of fishing a solution.

A second research agenda is underpinned by conceptual discussions around the agency of non-humans in geography and allied disciplines. Notably absent from this thesis is the agency of Mullet. Attention has focused on human agency expressed through capitalism, social power and the production of knowledge. The conceptual lens employed in this thesis has acted to 'silence' the agency of fish. Have fishers gained more importance in the eyes of management rather than the fish itself? Are we doing too much for the people and not enough for the fish? A future research agenda could engage with recent scholarly debates in geography that engage with materiality to think about ways of giving agency back to Mullet. One helpful starting point in this future research agenda is the work of Atchison (2017) on killing carp, where returning agency to carp is noted.

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## APPENDICES

### APPENDIX 1:

#### PARTICIPANT INFORMATION SHEET

**TITLE:** Uncovering knowledge conflicts surrounding Mulloway in NSW

**PURPOSE OF THE RESEARCH:** to better understand the conflicted knowledge surrounding Mulloway in NSW.

#### **INVESTIGATORS:**

Professor Gordon Waitt, University of Wollongong, Faculty of Social Sciences,  
[gwaitt@uow.edu.au](mailto:gwaitt@uow.edu.au)

Dr Michelle Voyer, Australian National Centre of Ocean Resource and Security,  
[mvoye@uow.edu.au](mailto:mvoye@uow.edu.au)

Bridget Mullany (student investigator), Faculty of Social Sciences,  
[beemullany@gmail.com](mailto:beemullany@gmail.com) 0432614986

#### **WHAT YOU WILL BE ASKED TO DO:**

If you would like to participate you can choose to share your stories and views surrounding Mulloway fishing and the threats to the species, at a public place convenient to yourself. You may also elect to participate in a go-along where you would take the researcher on one of your fishing trips, trawls or fieldwork.

Your involvement in the project is completely voluntary and how much time you wish to dedicate to the project is up to you. You may choose which stages to participate in.

Stage 1: Talking Mulloway – In this stage you will be asked to tell us a bit about yourself and your knowledge of Mulloway.

The semi-structured interview is divided into four sections;

- What does Mulloway mean to you?
- What do you know about Mulloway?
- What do you think the threats are to Mulloway?
- What do you think the solutions are for Mulloway?

Stage 2: ‘Gone Fishing’ The go-along

With your consent the researcher will accompany you along on a fishing trip, trawl or fieldwork trip. Conversations will occur during the go along to further learn more about what you know about Mulloway.

#### **POSSIBLE RISKS and INCONVIENCES:**

Apart from the time taken to participate in this study we can’t foresee any inconvenience for you. Our Mulloway conversation will be around 1 hour in duration. The go-along interview generated by accompanying a fishing trip, trawl or fieldwork will last around 3 hours. There will be no pressure placed upon you to answer any questions that make you uncomfortable. Your involvement in this project is entirely voluntary. You may stop your participation at any time and you may also withdraw any data you have provided this project up to the end of July 2018. Not partaking in the project will not affect your relationship with the University of Wollongong.

#### **BENEFITS:**

This honours project is a collaboration between the University of Wollongong and the Australian National Centre of Ocean Resource and Security.

We believe that this project will have the following benefits. First, participations in this study is an opportunity for you share your stories and views within a public realm.

Second, your knowledges will help to inform the issue of Mulloway resource conflict. By sharing your knowledge you will help inform the boarder issue of resource conflict.

## **KNOW SOMEONE WHO MAY BE INTERESTED?**

If you know of someone who might like to be involved in this project you can give them any of the emails listed above to contact. We will send them this information sheet to let them know more about the project.

**ETHICS REVIEW AND COMPLAINTS:** The Social Sciences Human Research Ethics Committee, University of Wollongong, has reviewed this study. If you have any concerns or complaints regarding the way this research has been conducted please contact the UOW Ethics Officer on (02) 4221 3386 or email [rso-ethics@uow.edu.au](mailto:rso-ethics@uow.edu.au). If you have any questions about this study, please contact the team leaders, Gordon Waitt (02 42 213684) or Michelle Voyer (02 4221 4653).

## **APPENDIX 2.**

### CONSENT FORM



**RESEARCH TITLE:** Uncovering knowledge conflicts surrounding Mulloway in NSW

**RESEARCHERS:** Gordon Waitt, Michelle Voyer and Bridget Mullany

Faculty of Social Sciences, University of Wollongong.

I have been given information about the project 'Uncovering knowledge conflicts surrounding Mulloway in NSW'. I have discussed the research project with Bridget Mullany, who is conducting this research as part of a University of Wollongong Honours thesis in the Faculty of Social Sciences at the University of Wollongong.

I have been advised of the potential risks and burdens associated with this research, which include the time taken to participate in interviews. I understand that my participation in additional 'Gone Fishing' research activities (a go-along) is optional. Consent will also be reconfirmed before each interview.

I understand that my participation in this research is voluntary, I am free to refuse to participate and I am free to withdraw from the research at any time. If I decide not to participate or withdraw my consent, this will not affect my relationship with the University of Wollongong. I also understand that I can withdraw any data that I have contributed to the project up until the end of July 2018.

If I have any enquires about the research, I can contact Gordon Waitt (gwaitt@uow.edu.au) or Michelle Voyer (mvoyer@uow.edu.au). If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Ethics Officer, Human Research Ethics Committee, Office of Research, University of Wollongong on (02) 4298 1331 or email rso-ethics@uow.edu.au By signing below I am indicating my consent to (please tick):

☐ Participate in an interview

☐ Have an audio-recording of the interview made for the purposes of transcription

☐ Having researchers accompany me on a fishing trip

☐ Have an audio-recording of the fishing trip made for the purposes of analysis

☐ Take photographs of the fishing trip made for the purposes of analysis

I understand that the data collected from my participation will be used for an honours thesis and may be used to write academic journal articles, books and conference papers. I also understand that the data collected may be used when communicating research outcomes to the media. I consent for the data I provide to be used in these ways.



Signed

Date

Name (please print)

.....

...../...../.....

.....

**APPENDIX 3:**

RECRUITMENT MESSAGE



Dear X,

Do you want to share your stories and views surrounding Mulloway in the Hawkesbury?

My name is Bridget Mullany and I am a Geography honours student at the University of Wollongong and I am conducting a project exploring the knowledge's and conflicts that surround Mulloway in the Hawkesbury region.

I am particularly interested in learning about the differing views of recreational and commercial fishers that encounter Mulloway, along with fisheries managers and scientists that research the species.

Does this interest you?

Participation in the project involves two stages; Stage 1) an Interview, and Stage 2) "A Go-along."

The first stage would involve talking to myself about your personal knowledge and interaction with Mulloway.

The second stage, "The Go-along", would involve inviting myself along one of your fishing trips, trawls or fieldtrips. You can participate in do both or one just one stage. It is completely up to you.

If you are interested in participating I can send through a Participant Information Sheet via email or the post, whatever is easiest for you.

Thank you for your time.

Yours Sincerely,

Bridget Mullany.

## **APPENDIX 4**

### **SEMI-STRUCTURED INTERVIEW**

#### **RECREATIONAL FISHERS:**

**At a personal level, what does Mulloway mean to you?**

- Is Mulloway a species that you target, and why?
- Please, tell me more about how you became involved in Mulloway fishing?
- Tell me about your first ever or most memorable interaction with Mulloway.
- Tell me more about the equipment you use to catch Mulloway?
- How often do you fish for Mulloway?
- How much of your personal time do you devote to your interaction with Mulloway?
- What happens to the Mulloway you catch?

**What do you know about Mulloway?**

- Where do you fish for Mulloway?
- From your personal interactions with Mulloway, have you noticed any changes to the species over time?
- What have learnt about Mulloway through your interactions?
- Outside from your first hand knowledge and experience, where do you seek or find further information surrounding Mulloway?

**What do you think the threats are to Mulloway?**

- Do you believe Mulloway stocks to be in trouble?
- What do you think are the main threats to Mulloway?  
-Economic, Cultural, Environmental.
- Do you believe there is a group of people responsible for any trouble seen to be surrounding Mulloway?
- Tell me more about your concerns over future access to Mulloway?

**What do you think the solutions are for Mulloway?**

- Do you believe the current management of Mulloway to be adequate?
- What do you believe is the number 1 priority for Mulloway Management?  
-For government, for the recreational and commercial fishing sector and for you as an individual
- In your experience what has inflamed the conflict surrounding Mulloway?
- In what ways do you believe this conflict could be resolved and/or reduced?

## **COMMERCIAL FISHERS:**

### **At a personal level, what does Mulloway mean to you?**

- Can you tell me about the type of fishing that you do.
- Tell me more about the type of boat you use, your equipment and the species you target?
- How often do you fish and where?
- Do you interact with Mulloway, and how?
- Has Mulloway caused you to change the way you fish?
- What happens to the Mulloway you catch?

### **What do you know about Mulloway?**

- Are there areas where you are more likely to encounter Mulloway?
- From your personal interactions with Mulloway, have you noticed any changes to the species over time?
- What have learnt about Mulloway through your interactions?
- Outside from your first hand knowledge and experience, where do you seek or find further information surrounding Mulloway?

### **What do you think the threats are to Mulloway?**

- Do you believe Mulloway stocks to be in trouble?
- What do you think are the main threats to Mulloway?  
-Economic, Cultural, Environmental.
- Do you believe there is a group of people responsible for any trouble seen to be surrounding Mulloway?
- Tell me more about your concerns over future access to fisheries because of Mulloway?

### **What do you think the solutions are for Mulloway?**

- Do you believe the current management of Mulloway to be adequate?
- What do you believe is the number 1 priority for Mulloway Management?  
-For government, for the recreational and commercial fishing sector and for you as an individual
- In your experience what has inflamed the conflict surrounding Mulloway?

- In what ways do you believe this conflict could be resolved and/or reduced

## **FISHERIES SCIENTISTS AND MANAGERS:**

### **At a personal level, what does Mulloway mean to you?**

- Please, tell me more about how you became involved in Mulloway research or management?
- Tell me about your first ever or most memorable interaction with Mulloway.
- Tell me more about you study Mulloway?  
-equipment, methods.
- How often do you conduct fieldwork on Mulloway?
- How much of your professional time do you devote to your research with Mulloway?
- What happens to the research you conduct?

### **What do you know about Mulloway?**

- Where do you conduct fieldwork?
- From your research of Mulloway, have you noticed any changes to the species over time?
- What have learnt about Mulloway through your research?
- Outside from your first hand knowledge and experience, where do you seek or find further information surrounding Mulloway?

### **What do you think the threats are to Mulloway?**

- Do you believe Mulloway stocks to be in trouble?
- What do you think are the main threats to Mulloway?  
-Economic, Cultural, Environmental.
- Do you believe there is a group of people responsible for any trouble seen to be surrounding Mulloway?
- Tell me more about your concerns over the future of Mulloway?

### **What do you think the solutions are for Mulloway?**

- Do you believe the current management of Mulloway to be adequate?

- What do you believe is the number 1 priority for Mulloway Management?  
-For government, for the recreational and commercial fishing sector and for you as an individual
- In your experience what has inflamed the conflict surrounding Mulloway?
- In what ways do you believe this conflict could be resolved and/or reduced?